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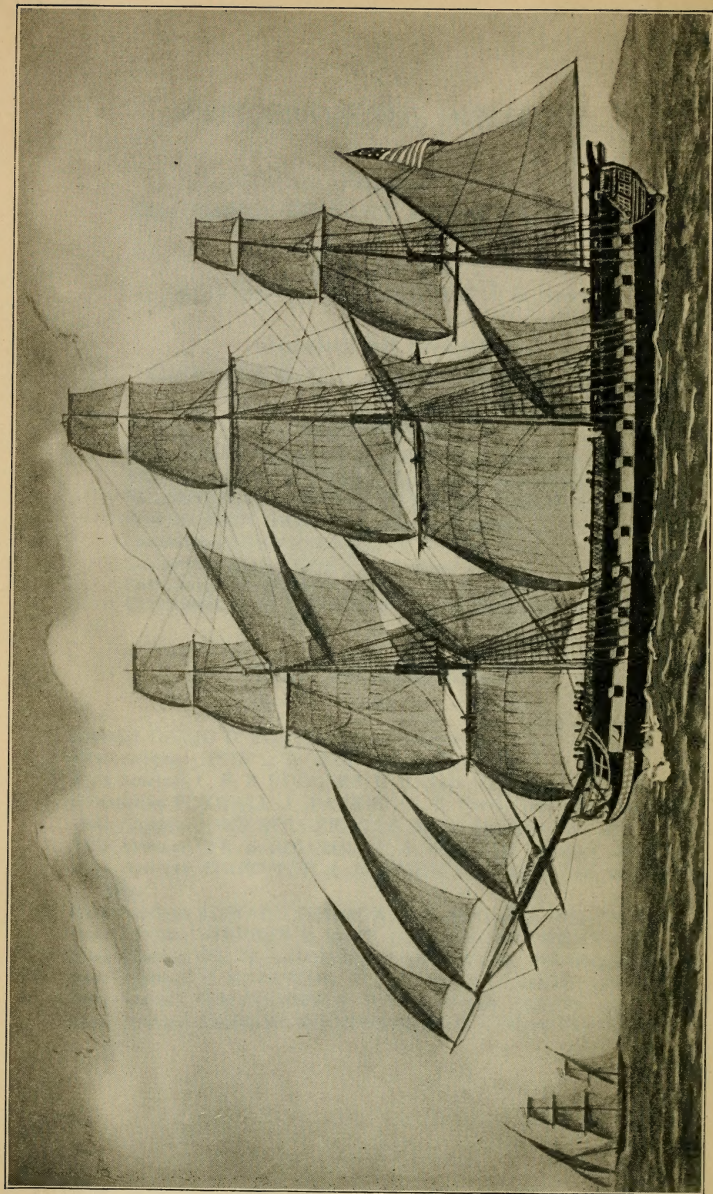
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THE FRIGATE *Essex* 32 GUNS, BUILT IN 1799

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE STUDY OF STRATEGY

BY CAPTAIN REGINALD R. BELKNAP, U. S. NAVY

The following paper was prepared and read as a lecture at the Fleet-War College Session, August 9, 1922, with the chief aim, by describing in outline the purpose, field, and requisites for the broad study of the art of war, to impress, especially on younger officers, the importance and advantage of systematic and wide reading as a foundation for applied study later.

One does not go far in any reading on strategy without realizing how closely strategic considerations are intermingled on the one hand with questions of policy and on the other with questions of logistics, or, in more general terms, how largely the method of accomplishment is determined by both the end in view and the disposable means. And so, in the arrangement of the course at

The picture of the *Essex* used as frontispiece of this issue is from an old painting, made during her career at sea, and now in the Peabody Museum.

The Frigate *Essex* was one of the famous frigates of the War of 1812. After nearly two years of unbroken successes, she was attacked in March, 1814, in the Bay of Valparaiso, by two British frigates. Greatly outclassed, she defended herself with such dogged courage and audacity as has few parallels in history, and struck her flag only when half the crew were either killed or wounded, and the ship a wreck. This historic defense of the *Essex*, under Captain David Porter, with Farragut as a midshipman on board of her, is one of the most cherished traditions of the Navy.

The picture facing page 2010 of the November, 1922, PROCEEDINGS, through printer's error wrongly labelled "ESSEX," was in reality that of ship "FRIENDSHIP."

EDITOR.

the Naval War College, the Department of Strategy includes the studies of policy, strategy, and logistics.

There is fundamental need also, in almost any study touching the relations between countries, of some familiarity with international law. One must have a working knowledge of the rights and duties of nations, their exemptions and obligations established by accumulated experience as necessary and so recognized by the civilized world. Especially in a war study, one needs to understand what is normal practice and, when normal conditions are overthrown by war, what practices may be approved, tolerated, questioned, or condemned. The great force behind all manifestations of governmental power is public opinion, and international law is a formulation of that opinion in such matters and to such extent as discussion has settled down into agreement. All naval officers of the line by requirement, and many others through interest, study this branch of law in the course of service, and here at the War College one's interest in the subject is stimulated by the many and various situations that may confront a naval command. Specific questions in international law arise constantly and some of them are given special discussion at the College. This is only one aspect of the widely recognized influence of the Naval War College on the formulation and observance of international law. The subject is the work of a separate department of the college, but it needs mention here as the common groundwork of all our studies.

The basic concept of international law is agreement, as distinguished from the compulsory enforcement of a nation's internal laws. Outside a nation's boundaries there is neither a court for appeal nor any common force to compel another nation. Arbitration has become of frequent resort but is not yet accepted for vital matters, in which the pressure and support for war might be wide spread and strongest. In the field of the world all nations claim equal right, with no restraint other than voluntary agreement by treaty, the moral influence of international law, and the limitations of their own power. And so the government has need to consider other nations' interests in the international field, if our own are to be so conducted as to gain the ends desired without clash or disaster.

As people multiply, their activities push more and more be-

yond the home boundaries, becoming more widely and deeply interwoven with the interests of other peoples. Racial, geographical, social, and other elementary factors influence a nation's development, gathering force so quietly yet so powerfully as often to exceed the control of government during the average life of one administration. But in the course of years, as the vitality of some tendency becomes manifest through the recurrence or persistence of similar indications, the administration formulates a corresponding attitude or course of action on the part of the government, to guide, foster, or restrain the tendency in question, as may best serve the welfare of the nation as a whole. Such are the origin and nature of national policy; and it is evident that between strong pressure at home and competitors of equal claims abroad, shaping a foreign policy is not a free choice but rather the discernment of the natural causes which underlie a national activity.

When such an external policy comes into competition with the valuable interests of other nations, the possibility of war may arise, and it is here that the study of strategy connects; for it is an obvious duty of government to consider whither a nation's policy may lead and, if persistence in it may bring on war, then to weigh the gain by war against the probable cost. To determine the possibility of such gain and the cost of it are questions of strategy.

The large idea conveyed by the word strategy deals with the ways and means to achieve the ends of policy. It is applied with equal freedom to broad schemes, such as a general plan for war, and to comparatively minor and more specific matters, as the disposition of the forces for a single engagement. Briefly, strategy answers the question how to do what policy requires, and in making the answer, it runs down successive stages, each one entering more into detail, to the final province of war preparation and tactical action. Mahan says, "How best to use naval power. . . . is naval strategy, whether applied in peace or war."

How a force may be employed to best advantage depends of course upon the kinds, degrees, and places of the effects it can produce. To determine these we must consider not only the power and mobility of a force but also its maintenance, for to gain the ends of policy by war usually requires not merely a single blow

but sustained military effort. Considerations of maintenance lie in the field of logistics, which in naval application embraces supplying, moving, and refitting the fleet in the best order and security. Under this head come matters of direction, distance, bases, supply, resources, lines of communication, and the degree of preparation during peace, considering how the enemy side will be affected by all these factors as well as our own side.

Thus policy, strategy, and logistics, on the background of international law, form one study, of the national purpose combined with the method and the means to effect it by military force if necessary. Policy, though the product of natural forces, must yet give heed to the warnings and advice of strategy. Strategy, though working in terms of life and death, must yet, as the servant of policy, aim at the objective dictated by policy. Logistics, which deals with necessities and possibilities, influences the decisions of strategy, often to a controlling degree. For example, in the late war, policy called for a mine barrage across the North Sea. Strategy tentatively chose the location Aberdeen-Ekersund, near the Skagerrak, but in that position constant support would have been necessary. The logistics for such support required a base in Norwegian waters. Policy could not stand for that, so Strategy moved the location far enough northward, away from the enemy, to dispense with constant support.

The course in strategy as conducted at the War College consists of four main parts—reading and thesis writing, problem solving, chart maneuvers, and discussion. Reading is supplemented by lectures.

The reading list issued by the Strategy Department, although far from comprehensive, includes many more books than the average reader can absorb during the eleven months of the course, but most of the officers in every class are already familiar with some of the works recommended, and many of them will of course continue their reading after completing the work here. Beyond outlining the reading course, inviting comments on it, and examining the theses turned in, the Staff exercises no direction over student officers' reading. But there is one important suggestion made, that, in reading on strategy, some one or more works should be studied with deliberation, in order to get the authors' true meaning and fully consider their deductions and illustra-

tions. This suggestion is made with Napoleon's oft-quoted avowal in mind, that his apparent flashes of genius were but inspirations arising from diligent study. Such painstaking, reflective reading is the best kind to stock the mind with information and develop the ability to apply it. Though several books may be read rapidly in order to get a wide range of view on some particular topic, the understanding of principles which is derivable from the works of Murray, Mahan, Corbett, Von der Goltz, Wilkinson, Clausewitz, Foch, can be realized only by painstaking study. "Sound military principle is as useful to military conduct as moral principle is to integrity of life."—Mahan.

In direct connection with the reading comes the writing of theses, one on policy and another on strategy and logistics. This part of the course seems at the outset very laborious, but with few exceptions the members of every class pronounce in favor of it, as the best means to clarify one's understanding and crystallize one's thoughts upon the subjects read. Clear understanding and clear thinking are indispensable for imparting to others a clear expression of one's own views and intentions, and, as Admiral Mahan says, "A man who thinks clearly will very soon want to speak clearly, and to have accurate words in which to express his thoughts."

Reading and thesis writing cultivate the powers of analysis, critical examination and comparison, reflection, and expression. One acquires some appreciation of the principles of war through observing how their correct application or their disregard has made for success or failure in the past, and wider reading shows more and varied instances of similar results from similar measures. The mind is thus broadened, the memory stocked, and the imagination stimulated, all of which are essential to preparation for high military responsibility. More than these are needed, however, for while it is important to know and to understand the past critically, the military commander must also, and above all, have constructive ability, to penetrate quickly to the essentials of a situation and thereupon decide with confidence. He must be able to grasp and to act appropriately in season.

In his book, *The Art of Fighting*, Rear Admiral Bradley Fiske says,

The sine qua non of the strategist is imagination. He must foresee the circumstances under which the next great conflict will be fought, and

prepare plans and appliances of the highest order of completeness and novelty to meet them with success. It is well to study the campaigns of the great commanders of the past, but not exclusively. The war that the strategist must win is not the last war but the next war.

and Spenser Wilkinson says:

. . . . the clear eye, which sees into the heart of the situation, can never be obtained except by a man who by repeated efforts has thought out to their very essence, and to their ultimate elements, all the problems of war, so that the principles of strategy have become incorporate with the fibre of his mind, and he is incapable of violating them.

Whether one possesses both the requisite grasp of the principles of war and the ability to apply them constructively can only be determined by test, and the solution of problems furnishes such a test. War College problems are based on an assumed general situation, which is known to both sides, and a special situation for each side, known only to that side. They are made as realistic and as true to possibilities as known experience permits. Existing types of vessels and weapons and existing fleets are used. In this way the problems serve to develop facility in applying the principles of the art of war to the forces of the present day, while by throwing light on current and proposed methods, these studies sometimes bring out the desirability of new or modified types or of greater numbers of existing types, or other apparent improvements, and furnish a test of them before any money is spent on actual experiment.

The strategist's real field of operations is the chart, or as Jomini said, strategy is "war on the map."

Stimulus comes from the opportunity to do a task large enough to arouse the interest, and efficiency from the freedom to bring one's personality to bear in a manner harmonious with its nature. Well scattered responsibility sobers and settles a force of executives, and develops and seasons their talents; for individual character is not developed by *imagining* responsibility, but by actually carrying it.—"Military History and the Science of Business Administration."—Prof. E. D. Jones.

Practical knowledge cannot be acquired in a hurry, it cannot be communicated by a process of cramming, for its valuable quality is the judgment in action which comes only from long exercise. . . . It is by the exercise of authority under the weight of responsibility that character is formed. (DILKE-WILKINSON).

About half of our problems in strategy are accordingly given the further test of actual maneuver on the chart. Two officers

are selected as the chief commanders on the two sides, each to put into effect his solution of the problem. Subordinate commanders are detailed, given their first orders, and shut up in separate rooms; communication is allowed only by radio, cable, or signal, allowing the lapse of time for transmission as it would be in reality; wind, sea, and atmospheric conditions are taken from weather charts; the officers concerned are conscientious in always making decisions with serious attention, not doing anything that could not or would not be done in actual practice, and not using information which has been received informally or contrary to possibilities in similar actual circumstances; and in all other respects service conditions are simulated as far as practicable. As soon as a little familiarity with the machinery has been acquired, the maneuver progresses in a very interesting way. Some artificiality is unavoidable, some decisions on contacts and minor engagements must be arbitrary, and the maneuver sometimes drags, yet with all its imperfections the chart maneuver impresses the care, the anxiety, the doubt, the tension, the unremitting responsibility, of naval commanders. With thirty to fifty experienced officers intent on the problem, during the maneuver and afterwards in the critique, the conduct of the forces is sure to undergo an instructive inspection. But the chief value lies in the demonstration, plain before all. There on the chart each officer can see his own work, his chief's work, every other commander's work. It is no longer a question of what you *would* do. There is the record of what you and they *did*—where one can judge by actual results whether plans, orders, subsequent decisions, when put to a fair, open test, proved to be "the right thing, rightly applied, in time." Mutely but eloquently the chart testifies that luck favors good management and that "fate punishes errors of judgment as remorselessly as guilt."

The fourth means of training, frank discussion, is second only to individual effort on problem work. After the student officers' solutions of a problem have been read by the Staff, a written critique is drawn up, analyzing the problem, commenting on features of the students' solutions, comparing them with the treatment of similar points in a solution prepared by the Staff, and bringing out the important principles involved. A solution by the Staff is given out, not as the only correct answer but as one

deemed acceptable which, so far as it withstands criticism itself—to which it is freely open—furnishes a standard by which to compare and criticize the others constructively. The moves of the chart maneuver are shown by lantern slides, and some situations are shown also as they would have been under the staff solution, for clearer illustration of the principles or suggestion embodied. This critique is the basis for discussion of the problem in all its features.

The discussion is entirely impersonal, aiming only at mutual and general benefit. Considerations of rank do not enter. Rank by itself confers no degrees of infallibility in war, but the recognition by high rank that the military art depends upon facts and principles, not opinions, goes far to foster that confidence in the leader on which success so largely depends. The fundamental characteristic of all higher institutions of study is freedom of thought and expression, which is indispensable in all investigational work. We are seeking for truth, to prepare ourselves to deal with cold, hard facts, in the face of an active, trained enemy doing his utmost against us. No test applied during our preparation can equal the stress of war. How then can we be satisfied with less than the severest test that is available? If my solution of a problem is not proof against the kindly criticism of my friend in the next room, what chance would it have in war? If my junior beats me on the maneuver chart, I should be thankful for the lesson. An enemy would not consider my feelings until after the battle. If there be any error committed, any defect, let it be revealed in time for remedy, and if the matter in doubt proves to be really sound, the question establishes it more firmly. Only weakness shuns the light.

The following words of Corbett on discussion, published in 1911, seem prophetic of some difficulties of the late war :

How often have officers dumbly acquiesced in ill-advised operations *simply for lack of the mental power and verbal apparatus* to convince an impatient Minister where the errors of his plan lay? How often, moreover, have statesmen and officers, even in the most harmonious conference, been unable to decide on a coherent plan of war from inability to analyze scientifically the situation they had to face, and to recognize the general character of the struggle in which they were about to engage.

In such connection, and on lower planes as well, discussion, in addition to its investigatory value, trains officers for staff

duty, to present their views and estimates concisely and clearly, and trains a chief to grasp and weigh them. To retain the admiral's confidence, the staff must see that he is correctly informed, including views which differ from his own. To express such opinions may not always be easy to do, yet whenever an opinion is given, it should be genuine conviction, unbiased by different views held by others. In the chief's consideration before deciding, the opinions of his staff have weight. One of the maxims printed on Marshall Field's pay envelopes read, "Loyalty requires a subordinate to stand up for his own opinions to his chief and for his chief's policies to the world." Free discussion improves the quality of one's opinions and accustoms officers to express them acceptably as well as with due force.

Thus the course provides for reading on broad lines and on the particular, for writing on the abstract and on the concrete, for derivation of principles from the past and their application to problems of the future, for repeated and varied practical test of our own work by experienced hands, and finally, for the review of all in the light of full and open, first hand discussion and constructive criticism. "Reading maketh a full man, writing an exact man, conference a ready man." Military character requires all three qualities and it is on well developed character that efficiency fundamentally depends.

From the foregoing description it will be seen that the course combines the historical and analytical with the applied and constructive. From past performances we learn the apparent reasons for success or failure, but deductions from history must usually be taken with reservation, because seldom is our information complete and altogether trustworthy. Official reports conflict, first hand notes often lack essential details, and historical writings are inevitably tinged with the authors' views, sometimes intentionally colored. And in any case, it is never possible to reproduce a situation in its entirety nor to interpret exactly, after the event, the mind of another person who was a factor in it. The cold critic in his quiet study breathes a far different atmosphere from the active commander. Examination of the mistakes of others, while instructive, is negative, showing what not to do. The same kind of study also brings out the good and strong qualities of successful leaders, but one does not acquire practical

skill merely by observing other players. One can learn, to be sure, more that way than by merely studying the rules and penalties, but constructive ability as an actor—as one who creates an effect—is developed only by practice under rules well understood. Our problems and chart maneuvers give this constructive practice and in so doing they introduce the human equation under the conditions of the man who must decide. These elements, the personal equation and the mental attitude of the man who faces responsibility—elements which are lacking in a merely critical course of study—are indispensable for true appreciation of the principles of war.

The purpose of our study, however, is not to dwell on the mistakes but to seek out their causes. How does it come about that, making due allowance for the fog of war, weight of responsibility, and pressure for time, decisions have yet not infrequently been made on certain courses of action, objectives, or distributions of force which the outcome shows to have been initially wrong? The repeated commission of similar mistakes seems a sure indication of the existence of some cause or causes of such errors. To discover what these may be is what interests us most, for in proportion as these underlying causes of error can be eliminated or diminished, we shall advance towards the successful conduct of war. Our problems and chart maneuvers reveal some striking indications of such fundamental causes of error.

First, as to the purpose of action. There is no cause without some effect. Military action is a cause employed by government to produce or hasten a desired effect. How important then for the commander to grasp thoroughly what the desired effect is, so that, among several courses of action that may bring it about, he may choose the one best suited to the purpose; how necessary that a vague or indifferent understanding shall not lead astray. This seems so obvious, why mention it? Yet history, recent as well as remote, and examples in our work here, show numerous instances where, instead of knowing the purpose of their instructions, military commanders misunderstood their purport, had only a feeble grasp of it, or were in the dark.

Against such lack of true directive force, a lack which fosters a tendency to pursue or accept a course blindly, the best corrective is the broad cultivation recommended by Mahan and by other authorities of our profession.

Every naval officer should order his study, and his attention to contemporary events, abroad and at home, by the reflection that he may some day be an adviser of the Government, and in any case may beneficially affect events by his correct judgment of world-wide conditions. In Nelson's phrase, "An officer should have political courage." Political courage, to be well based, requires political knowledge as well. That you may more effectually concentrate upon this necessary knowledge, avoid dissipating your energies upon questions interior to the country. . . . The sphere of the navy is international solely.

So likewise with subordinate commanders in successive lower grades. When leaders understand the main purpose, they may direct their efforts towards the desired result effectively, sometimes even when orders from higher authority no longer apply. Knowing the great purpose, each can see his own task not as a separate operation but as part of a larger undertaking, and the most decisive successes have come about where the chief's purpose and spirit found expression in the unity of his subordinates' actions.

A second lesson—obvious like the first, yet far from general observance—is to have a plan appropriate to the purpose. Often there have been parts of plans and plans of parts, but such looseness tends to confuse rather than to lead straight. The plan should be complete for accomplishment of the mission, with reasonable promise, barring resistance that cannot be foreseen, of carrying through to a finish. It is not implied by completeness that there shall be a mass of detail—quite the contrary. The dominant characteristic is not a strait-jacket but backbone, with the elasticity and flexibility, as well as strength, of an expert boxer. How to make such a plan, determining the kind, the place, and the strength of effort which the purpose requires, together with provision against enemy interference, can be attained only by painstaking study of war. To acquire such ability to plan is one main purpose of War College training.

The most expensive lesson of all history, yet the one most persistently ignored, is that for any plan there should be adequate preparation. Field Marshal Robertson* says "It is a difficult and long business in war to make up for a bad start." Viscount Esher says "Naval supremacy cannot be extemporized. It must

*Chief of Staff, British Expeditionary Force in France, afterwards Chief of Imperial General Staff until March, 1918.

be forecast and carefully prepared." Cordonnier says, "In proportion as war becomes more scientific it comes less within the province of improvised soldiers." So much for the material side, but of all elements of preparation, the most important and the longest to develop is the professional training of officers. Our service furnishes experience and opportunity for study, but the higher results depend on the effort of the individual.

Instruction forced upon the mind by others is lazily and ineffectually received; few have been taught to any purpose who have not been their own teachers. (SIR JOSHUA REYNOLDS.)

A fourth great lesson is the importance of adherence to plan. The first requisite is that the plan must be made with a view to command confidence under the stress of conflict. Next, for its execution as intended, the surest guaranty, after character and training, is freedom from subordinate details in high places. In naval warfare it may often be impossible for the high commander to be detached from the hot fighting, and on occasion his mere presence may exert decisive influence. With due skill on his part, however, such occasions will come about in accordance with his plans, not in spite of them, for the wider their scope, the more important becomes adherence to them.

By reserving to himself no special function but, instead, committing the several parts of the conduct and support of his plan to competent hands, he is thereby relieved of all current detail, free to keep in touch with the situation as a whole, and on that impartial basis to decide any question that may arise. Such freedom likewise enables him to move about at will on the instant, without necessity for turning over local command. He still retains general command but there is no reason why he should control current affairs or the local fighting incident to support. His principal subordinates, and their subordinates in turn, are competent in their respective spheres to decide and act locally as their respective local situations require, viewed in relation to the whole plan. So long as they make good toward the plan—and as to whether they are doing so or not can usually be judged best on the spot—why should the higher commander interpose? Executive affairs in war take precedence over all else. Decisions on the battlefield cannot wait. Hence, when a general officer takes on also a subordinate function, some matters affecting

the whole may at any moment be thrust aside by relatively minor yet imperative demands of a single part. The heat of action, interruption, loss of time, hurried thought, irritation, fatigue—some or all of these will surely impair sound deliberation. Where great decisions are made there should be leisure and detachment from temporary influences. According to a recent story, Foch, when asked how he won the war, replied, "By smoking my pipe."

A plan that is the result of deliberate study must not be lightly put aside, neither by the high commander himself who made it nor by a subordinate in his own sphere. It is not sufficient merely to fight; the fighting in each area must accomplish towards the plan. The skilful leader shapes his tactics accordingly. As General Hamley says:

The commander of a detachment has often a very difficult task to perform. To carry out his task satisfactorily he must have a thorough knowledge of the broad situation and the plans of his general-in-chief. He must constantly remember that success at the decisive point is everything—that his every act must be directed towards, and subordinated to, that end. He must strive to gain the ends in view without exposing his detachment to defeat or unnecessary loss, but when the end cannot otherwise be gained he must not hesitate to fight, even in the face of certain defeat.

and Clausewitz:

Modern war calls for an intelligent use of initiative by subordinates, and it is certain that the subordinate who grasps the broad situation most clearly will solve the local situation most intelligently.

Another lesson impressed by the late war is the necessity for competent staff work. In his report on Features of the War, Sir Douglas Haig said:

The experience gained in this war alone, without the study and practice of lessons learned from other campaigns, could not have sufficed to meet the everchanging tactics which have characterized the fighting. There was required also the sound basis of military knowledge supplied by our training manuals and staff colleges.

The principles of command, staff work, and organization elaborated before the war have stood the test imposed upon them and are sound. The military educated officer has counted for much, and the good work done by our staff colleges during the past thirty years has had an important influence upon the successful issue of the war. In solving the various strategical and tactical problems with which we have been faced, in determining principles of training and handling of troops, and in the control and elaboration of army organization generally, the knowledge acquired by previous study and application has been invaluable. Added to

this have been the efficiency and smoothness of working resulting from standardization of principles, assisted in many cases by the previous personal acquaintance at the staff college of those called upon to work together in the field.

The course of the war has brought out very clearly the value of an efficient and well-trained high command, in which I include not merely commanders of higher formations but their staffs also.

. . . commanders have been faced with problems very different to those presented by the small units with which they have been accustomed to train in peace. That they exercised their commands with such success as most of them did shows, I venture to think, that their prior training was based on sound principles and conducted on practical lines.

Similarly as regards the staff, the magnitude of our operations introduced a situation for which no precedent existed. . . on the expansion . . . many officers had to be recruited for staff appointments—from good regular officers chiefly, but also from officers of our new armies. . . Though numbers of excellent staff officers were provided in this way, it was found, as a general rule, that the relative efficiency in staff duties of men who had passed through the staff colleges as compared with men who had not had that advantage was unquestionably greater.

Good staff work is an essential to success in all wars and particularly in a struggle of such magnitude as that through which we have just passed. No small part of the difficulty of achieving it lies in the possibility that officers on the staff of higher formations may get out of touch with the fighting forces, and so lose sense of proportion and become impractical. Every endeavor was made to avoid this by a constant interchange of such officers with others from the front, so that all might keep abreast with the latest ideas and experience, both in the fighting line and elsewhere.

Admiral Jellicoe, Field Marshal French, and our own high commanders speak in similar terms of the importance of competent staff work, and the German and general European view is well known to be the same. Foch is pre-eminently a staff-trained officer.

The function of the commander may be summed up in the words, *consider* and *decide*; the function of the staff is to submit for consideration and then to translate the decision into the detailed instructions requisite for execution. Said Count Hohenlohe-Ingelfingen in his letters on strategy,

Much importance attaches to the technical preparation of orders, certainty of their transmission, clearness, precision, completeness, and brevity of written orders and dispositions.

and Admiral Custance, in *The Ship of the Line in Battle*, says:

Quickness is of great moment in war, but a clear and rapid judgment is often more important than a fast ship.

Safe to say, in matters where only the chief can decide, his judgment is most likely to be clear and rapid when his mind has been set free from distractions by the good work of his staff. Hence the value of such training as acquired at the War College for lieutenant-commanders as well as for higher grades, nor can younger officers begin too early to lay a good foundation of studious reading, in anticipation of a command course as early as it can be obtained.

The supreme lesson which all studies of war force home is that, collectively and singly, all of us, on the experience of yesterday should prepare for tomorrow, and that we must do the work today. Again quoting Admiral Custance:

A man who has not pondered over the acts of the great leaders in wars of the past almost inevitably assumes the mental attitude of the bad workman who complains of his tools. He naturally asks for better ships and weapons, and relies on large ships, on thick armor, and on big guns. . . . It is only by study and reflection that an officer can come to know that victory does not depend mainly on such things but on the courage, the will, and the intellect of the admiral, and on the spirit with which he inspires the officers and men of the fleet. If this be accepted as true, then the war value of a navy is measured by the capacity of the admirals who control it, and by the spirit which animates the captains, officers, and men, rather than by the size or special characteristics of the ships.

Besides military writers, other fine minds could be cited for this as for other lessons of war. Time permits but one such quotation, taken from that genius of art and morals, John Ruskin. Though addressed to young army students at the Royal Staff College, his words are pertinent to the duty of every grade. He said:

. . . . While for others all knowledge is often a little more than a means of amusement, there is no form of science which a soldier may not at some time or other find bearing on the business of life and death. . . . Never waste an instant's time, therefore; the sin of idleness is a thousandfold greater in you than in others, for the fates of those who will one day be under your command hang upon your knowledge; lost moments now will be lost lives then, and every instant which you carelessly take for play, you buy with blood.

No good soldier in his old age was ever careless or indolent in his youth.

This limited discussion of strategy can barely touch upon many important points, but in the study of any campaign, the more we go into details, part by part, the more do two features stand out

prominently side by side—the condition of material and the advantageous employment of it.

In a prolonged contest, the side which is numerically inferior initially may count largely upon losses by the other side through attrition. In such a situation we should take care then lest the enemy derive more help from our shortcomings in material upkeep than from his own exertions. The degree with which a force maintains its strength as it advances will have profound effect on both sides and among neutrals as well, just as our fleet's world cruise in 1908-09 turned doubt and indifference in some quarters into respect and friendship. In a campaign far from our home coasts, distance from usual docking and repair facilities would soon bring us into difficulties, but as the great Spanish Marquis de Santa Cruz said, "If difficulty were an objection, nothing grand would ever be achieved." In the self upkeep of ships, our Navy has an unequaled tradition. On that inspiration we may develop our abilities to surmount tasks that will tax them to the utmost.

Not by material fitness, endurance, and economy alone, however, shall we achieve success. Our means must be employed to the best advantage throughout. We have no material to waste and our men have the right to be competently led. Centralized effort being always important, an enemy would try by every means to cause our effort to be diffused. Let us therefore study and plan to keep our strength central, for in dispersion lies our greatest danger. In many operations of many kinds our forces will seldom have more strength for their tasks than just enough *properly employed*. Small losses here and there, perhaps of little moment by themselves, when summed up would cut deeply into our total strength. To avoid them, even the most junior commanding officer must be something of a minor strategist in order to be a competent tactician for his degree of command, as well as a good ship captain. The most perfect ship will count for nothing if not in the right place, great speed may in emergency fail to bring a powerful battery into action through ill-considered original dispositions. In his book on *The Art of Fighting*, Admiral Fiske says:

In speaking of speed, one naturally thinks of the speed of the material units. . . . but there is another kind of speed—the speed of thought. The

victories of Caesar, Frederick, and Napoleon are instances of the value of speed. This speed is mainly evidenced by the quickness with which their troops arrived at certain points. The reason usually given for the quickness of their arrival is the speed at which they marched but let us not overlook the super-important fact that, antedating the speed of their marching, was the quickness of their starting, and that this was due wholly to the speed of thought of their great commanders.

Twenty years ago, half our battleship strength was scattered over the globe and the whole was brought together only against some opposition. The officer then virtually corresponding to the Chief of Naval Operations, Rear Admiral H. C. Taylor, who had formerly been President of the War College, said "We have held too much to the single ship idea. We shall not be strong until our officers learn *to think in squadrons*." We have since gone a long way on that road, yet it still leads far ahead, especially for the young officer. And hostilities of the late war are not yet so remote, nor the world's affairs yet so well settled, as to take away the pertinence to all naval affairs of the parting words to his command of the great Japanese naval officer, Admiral Togo:

Naval strength does not depend merely on possessing ships and guns, but mainly depends on an invisible but real power, the effective power of the men who use the ships and guns. . . . In war display strength, in peace accumulate it. . . . Heaven gives the laurels of victory in war to those only who keep themselves in training during peace and *win the battle* before it is fought.....
Tighten your helmet string after a victory.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A PERSONNEL SURVEY

BY COMMANDER J. S. MCCAIN, U. S. NAVY

Herewith is attempted an analysis of the future working of the Personnel Law of 1916, as applied to the line of the navy. Under that law the authorized strength of the line consists of 5,499 officers with numbers in ranks as indicated:

Rear Admirals	55
Captains	220
Commanders	385
Lieutenant Commanders	770
Lieutenants	1,787
Lieutenants (jg)., and Ensigns	2,282

The distribution of June 3, 1922, fixed the following numbers in grades:

Rear Admirals	44
Captains	176
Commanders	308, exclusive of extra numbers.

A board was convened which selected not only for the vacancies created by the Naval Academy class of 1922 as per distribution above, but also for estimated vacancies in selection grades due to known retirements and probable casualties which may occur up to July 1, 1923, excepting, however, the Naval Academy class of 1923. This will be taken as the policy of the future. That is, selection boards will be convened in June of each year, and will select for vacancies created by the Naval Academy class graduating that same June, and for vacancies which may ensue during the succeeding fiscal year.

The figures given in the tables below are based throughout, first, on what is known, after that on what past performances suggest may be future probability.

REAR ADMIRAL VACANCY SHEET
BASIS 5,499 Officers, Fifty-five Rear Admirals

Vacancies occurring in fiscal year	Prior to July 1, '24	Prior to July 1, '25	Prior to July 1, '26	Prior to July 1, '27	Prior to July 1, '28	Prior to July 1, '29	Prior to July 1, '30	Prior to July 1, '31	Prior to July 1, '32	Prior to July 1, '33	Prior to July 1, '34
Naval Academy classes of '23, '24, '25, '26, '27...	125	250	250	250	250						
Vacancies due to increase of the navy	1	3	2	3	2						
Due to retirements for age at sixty-four yrs. . .	2	4	2	2	6	2	3	8	4	7	5
Casualties, retirements other than for age, deaths, etc.	1	1	2	1	2	1	2	1	2	1	2
Total estimated vacancies to be selected for by June Board of preceding year.	4	8	6	6	10	3	5	9	6	8	7

CAPTAINS AGE IN GRADE RETIREMENT SHEET
BASIS 5,499 OFFICERS

	Prior to July 1, '24	Prior to July 1, '25	Prior to July 1, '26	Prior to July 1, '27	Prior to July 1, '28	Prior to July 1, '29	Prior to July 1, '30	Prior to July 1, '31	Prior to July 1, '32	Prior to July 1, '33	Prior to July 1, '34
From Sheet 1, total estimated R. A. vacancies occurring in fiscal year prior to date shown at head of column.	4	8	6	6	10	3	5	9	6	8	7
Total number of Captains who will retire at age of fifty-six in fiscal year prior to date at head of column if not selected. .	4	7	11	16	8	10	20	12	24	29	16
Minimum age in grade retirements of Captains, in fiscal year as indicated, assuming all selections to be made from those who would otherwise be retired.			4	10		5	15	3	18	21	9

CAPTAINS VACANCY SHEET—BASIS 5,499 OFFICERS,
220 CAPTAINS

Vacancies occurring in fiscal year	Prior to July 1, '24	Prior to July 1, '25	Prior to July 1, '26	Prior to July 1, '27	Prior to July 1, '28	Prior to July 1, '29	Prior to July 1, '30	Prior to July 1, '31	Prior to July 1, '32	Prior to July 1, '33	Prior to July 1, '34
Naval Academy Classes of '23, '24, '25, '26, '27.	125	250	250	250	250						
Vacancies due to increase of the navy	5	10	10	10	9						
Vacancies due to minimum retirements age in grade sheet 2			4	10	0	5	15	3	18	21	
Vacancies due to casualties, retirements other than age in grade, deaths, etc.	5	5	6	6	6	7	6	7	6	7	6
Vacancies vice Captains promoted	4	8	6	6	10	3	5	9	6	8	7
Total estimated vacancies to be selected for by June Board of preceding year	14	23	26	32	25	15	26	19	30	36	22

COMMANDERS AGE IN GRADE RETIREMENT SHEET

	Prior to July 1, '24	Prior to July 1, '25	Prior to July 1, '26	Prior to July 1, '27	Prior to July 1, '28	Prior to July 1, '29	Prior to July 1, '30	Prior to July 1, '31	Prior to July 1, '32	Prior to July 1, '33	Prior to July 1, '34
From sheet 3—total estimated vacancies in Captains list occurring in fiscal year prior to date at head of column.	14	23	26	32	25	15	26	19	30	36	22
Retirements of Commanders if not selected at age of fifty occurring in fiscal year prior to date at head of column.	1	5	6	6	16	16	16	31	42	59	69
Minimum retirements for age in grade assuming all selections to be made from those who would otherwise retire.		NONE			NONE			NONE			

Under increase of the navy it was considered that the class of 1923 would perhaps graduate 375 men. There is reason to believe that there will be a large number of separations from the service the coming year, so increase of the line from that class is placed at only 125.

Increase of the line for each of the classes of 1924, 1925, 1926 and 1927 is estimated at 250 men. Note that the class of 1927 will fill the navy to its allowed total of 5,499 officers.

The figures given for casualties, retirements other than age, deaths, etc., are not far from the twenty-year average on a percentage basis. They are conservative for the period covered because officers of long service, after a war, are apt to hold that their great professional opportunity has come and gone and therefore are not so strongly averse to separation from active service.

No account is taken of casualties to those officers who appear in the age in grade retirement column. The difference will be made up for by the widely scattered position of these officers on the lineal list, with the possibility that more will be passed over, and hence immediately retired than are shown in the minimum age in grade retirement column. Also there are officers older than the average of their lineal position yet to be selected, who will swell the column age retirement for the last four years. It is believed that altogether the only weak point in the estimate is the guess at the Naval Academy graduates, and the resultant increase to the line.

Some day, however, without change in law, the Naval Academy will fill up the line of the navy. Deferment of such filling up beyond 1927 will unfavorably affect some of the older Captains but will help some of the younger and will not harm the Commanders or Lieutenant Commanders.

Age humps appear, identified by the larger numbers of retirements for age. Such retirements cause vacancies in the grade with promotions from the grade next below, tending to bequeath the hump just eliminated by retirement of the oldest officers of a rank to the junior officers of the rank. This would probably be the case if the navy were now filled up and the Law operating normally, a condition not to be reached for several years yet, so that the varying ages of the officers in the rank next below who will be selected to fill the vacancies caused by retirements,

will cause a gradual flattening out of age humps, eventually all being eliminated.

The operation of the Law with full-up navy, and when the average age of the several grades has risen to normal, is estimated to be as follows:

Rear Admiral vacancies each year average 9.

Captains promoted each year average 9.

Captains retired each year average 26.

Captains vacancies each year average 41.

Commanders retired each year average 32.

Commanders promoted each year average 41.

Commanders vacancies each year average 81.

Lieutenant Commanders promoted each year average 81.

Lieutenant Commanders retired each year average 89.

Lieutenant Commanders vacancies each year average 185.

"Retired" refers to age in grade retirements.

The vacancies in the Lieutenant Commanders grade are carried along into the junior grades with increases for casualties in such grades.

The average age of attaining Lieutenant Commander will be forty and one-half years. The average age of attaining rank of Lieutenant will be thirty-two years. The yearly graduating class from the Naval Academy necessary to maintain the line at full strength is 270.

The following outstanding facts appear from a survey of the tables:

(a) Age in grade retirement of Captains because of lack of vacancies cannot be delayed longer than the fiscal year ending July, 1926. Complicated as age in grade is by lineal seniority the attention of the Selection Board will be most forcibly drawn to the problem a year or two earlier.

(b) In the eleven-year period covered there will be only seventy-two vacancies for the 157 Captains who will retire if not selected.

(c) Commanders have a comparatively easy thing of it. During the period covered there will be 268 vacancies for the 267 Commanders who will retire if not selected, also seniority will not be seriously injected into the situation until the fiscal year ending July 1, 1933. Their age average rises every minute, of

course, and there is a good deal of marking time in the grade. By 1934, practically all Commanders will be compressed into their five-year age period, forty-five to fifty years.

(d) Lieutenant Commanders to all purposes are in the same box as Commanders. The very few minimum retirements for age in grade in the years ending July, 1932, 1933 and 1934 will certainly be unnecessary due to casualties within the grade itself and to the normal functioning of the Selection Board in passing over the comparatively less efficient. All Lieutenant Commanders by July 1, 1934, will be compressed into thirty-seven to forty-five years of age period, the lower limit gradually approaching forty and one-half years.

(e) Only those Commanders and Lieutenant Commanders whose ages are considerably above the average age of their lineal positions need fear age in grade retirement because of lack of vacancies.

The predicament of the Captains has already caused remark and some activity. That rank having a good deal to do with policy and operation of this navy, many schemes will be considered to furnish relief.

The working of a few plans are guessed at herewith.

PLAN I. *Increase of percentage of Rear Admirals to two per cent, the resulting percentage decrease being taken out of Lieutenants (jg) and Ensigns.*

This will result in the promotion of all Captains considered qualified until the fiscal year ending July 1, 1936. In the next year the shoe will begin to pinch again though the average retirements of Captains will be decreased to seventeen yearly. If Rear Admirals are increased to one and one-half per cent, retirements of Captains for lack of vacancies will not begin until 1930 when the average of twenty-one per year will be approached.

Increase of the number of Rear Admirals will have no effect whatever on Commanders and Lieutenant Commanders, the Captains taking up the slack, if such a term may be used.

PLAN II. *Deferring the retirement of Captains to the age of fifty-eight for instance.*

This will compress the fifty-five Rear Admirals into a six instead of eight-year period and will result in an average of eleven Rear Admirals vacancies instead of nine each year. It will spread

out the number of Captains over an eight instead of six-year period and forcible retirement through lack of vacancies will not begin until 1930, the average number being eleven. This will be more than paid for out of the Commanders grade, a somewhat larger than the corresponding number being retired for lack of Captain vacancies. (Raising the age limit for retirement is a method of approximating seniority.)

PLAN III. *Lowering the age of admission to the Captains rank*, or what is the same thing and the way to accomplish it, lowering the age of retirement of Commanders.

This spreads out the Captains over a greater number of years and compresses Commanders into a smaller number of years causing fewer average yearly retirements of Captains and greater yearly retirement of Commanders. This will not help any of those Captains who appear on the minimum age in grade retirement columns, but will benefit the rank as a whole in the distant future.

The sole source of anxiety to Commanders and Lieutenant Commanders is that the lower halves of each grade must wait for ten or twelve years for promotion, but if they must mark time these are good grades in which to do it.

However, an increase in the Captains will both immediately and permanently benefit Commanders, though it will also increase the retirement of Captains; such an increase will neither help nor harm Lieutenant Commanders. The same is true of an increase of Commanders with respect to Lieutenant Commanders and Lieutenants.

Carrying the tables on down to include Lieutenant Commanders vacancies the following is guessed at as a minimum for each fiscal year of the eleven year period:

1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
62	90	91	98	86	28	41	34	50	67	53

These vacancies hold good for the lower grades after appropriate increases are made for casualties. Promotion for Lieutenants and Lieutenant (jg) is thus shown to be only fair until the navy is filled up when there is a decided slump. This slump continues for four years until age in grade retirement commences to get in its work on the upper grades. A steady increase each year

thereafter will be experienced until a yearly average of 185 promotions of Lieutenants to Lieutenant Commanders is reached. This number is of course handed down with increases to the Lieutenants (jg).

It is exceedingly interesting to compare the number of vacancies created by the Selection law in and above the rank of Lieutenant Commander with number created by the "Plucking Board" Act. That act required the forcing of forty vacancies per annum in and above the rank of Lieutenant. By custom and practices created by the Selection Law in and above the rank of Lieutenant Commander. The number of officers of the Line during the years of the "Plucking Board" régime averaged about 1,000. The number of officers of the Line for the next eleven years will average about 5,000, and the average number of vacancies of and above the Lieutenant Commander rank will average about fifty-five. The normal for a full-up navy of 5,499 officers is 185 per year. Proportionately, creation of vacancies alone considered, the "Plucking Board" Law is much to be preferred all the way through.

Age in grade retirements for Lieutenant Commanders is a dam which backs up the entire lineal lists of the junior grades. Any change of its age position or any increase or decrease in the promotions over it or retirements because of it, are transmitted without delay to the entire list back of it. Also any different percentage of Lieutenant Commanders affects at once all grades below Lieutenant Commander, not merely the grade next below. An increase in the number of Lieutenant Commanders will favorably affect all of the junior grades, except insofar as its favorable effects may be modified by the service in grade restrictions on Ensigns and Lieutenants (jg). It will increase the average time spent in the grade, lower the average age of attaining the grade and decrease the time spent in the Lieutenants grade particularly if the increase in Lieutenant Commanders is deducted from the Lieutenants.

If the Law, insofar as it is specific, with reference to age, or length of service in the various grades is taken as a statement of desirable fact, then the proper and desirable ages for an officer to attain the rank of Commander, Captain and Rear Admiral are respectively forty-five, fifty and fifty-six and the proper and de-

sirable lengths of time in each grade are respectively five, six and eight years. Just how the age of thirty-two for Lieutenants, and forty and one-half for Lieutenant Commanders, with eight and one-half years in the grade of Lieutenant, to but four and one-half in the grade of Lieutenant Commander, will harmonize with these desirable facts is a matter of opinion.

If it is considered desirable to positively insure a number of years of service as a Lieutenant Commander then it is necessary to extend selection a grade lower and institute age in grade retirement for Lieutenants if not promoted. Making the age three or even two years lower than forty and one-half years, the average age under present Law of attaining Lieutenant Commander, will cause a large number of retirements of Lieutenants, and will accordingly increase the number to be graduated from the Naval Academy to supply vacancies.

It may be of interest to forecast the date of promotion of several Captains and Commanders and Lieutenant Commanders.

The top of the navy list of Captains excluding extra numbers and assuming all previous selections to have been made from those who would otherwise retire will, on July 1, 1930, consist of the Captains whose numbers in the *Navy Register* of January 1, 1922, are as follows:

- | | |
|------------|-------------|
| 1. No. 126 | 6. No. 145 |
| 2. No. 135 | 7. No. 147 |
| 3. No. 138 | 8. No. 148 |
| 4. No. 142 | 9. No. 154 |
| 5. No. 144 | 10. No. 155 |

11. No. 156

Number of selections to be made this year nine. Number to be retired, if not selected, twelve.

The top of the Captains list under same assumption as above, will on July 1, 1932, consist of Captains whose numbers in the *Navy Register* of January 1, 1922, are as follows:

- | | |
|------------|------------|
| 1. No. 161 | 5. No. 173 |
| 2. No. 165 | 6. No. 174 |
| 3. No. 166 | 7. No. 180 |
| 4. No. 171 | 8. No. 184 |
| 9. No. 186 | |

In that year there will be eight promotions, with twenty-nine retirements for age in grade if not promoted.

The officer whose number is 340 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately thirty-four on the list of Commanders, provided no officers ahead of him on the list are passed over, then he should make his Captains number in the spring of 1925.

The officer whose number is 389 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately eighty-two on the list of Commanders and should make his number for Captain on July 1, 1926.

The officer whose number is 451 on the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately 146 on the list of Commanders and should make his Captains number on July 1, 1929.

The officer whose number is 511 in the *Navy Register* of January, 1, 1922, will on July 1, 1923, be approximately 206 on the list of Commanders and will make his number for Captain in the spring of 1932.

The officer whose number is 726 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately 320 on the list of Commanders and will make this number for Captain in the fiscal year of 1935 after some competition in the selection.

The officer whose number is 835 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately eighty-one on the list of Lieutenant Commanders and will make his number for Commander on July 1, 1925.

The officer whose number is 952 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately 200 on the list of Lieutenant Commanders and will make his number for Commander on July 1, 1927.

The officer whose number is 1061 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately 305 on the list of Lieutenant Commanders and will make his number for Commander in the spring of 1931.

The officer whose number is 1147 in the *Navy Register* of January 1, 1922, will on July 1, 1923, be approximately 392 on the list of Lieutenant Commanders and will make his number

for Commander in the spring of 1933, after some competition for selection.

This is not encouraging to the Junior Commanders and Lieutenant Commanders.

It may be remarked that for any given basis of officers, so long as the percentages remain unchanged, there is no change in the average opportunity for promotion nor in the average age of attaining the various grades. This does not apply until an excess or a deficiency in the total numbers of officers allowed has been consumed or made up nor until the average age of the various grades has risen to normal.

Complicating the foregoing estimates and guesses is the extremely uncertain conjecture of possible changes in the essentials of the Act of August 29, 1916. The factors for and against change are diverse within and without the service. The most important within the service hinge upon the action of selection boards in the cases of officers who face retirement for age in grade.

There are two things, and two things only, vitally affecting an officer's fortunes and misfortunes on the lineal lists which are accepted by him with calmness and equanimity. These are the date of his birth and his class standing at the Naval Academy. In whatever this accident and near accident respectively may do for or to him, he cheerfully acquiesces. A threat to his lineal position from any other source arouses his immediate and active hostility. The "Plucking Board" assaulted and weakened the principle of seniority, formerly held impregnable. That board met with fierce resistance and was finally overthrown.

The Selection Law renews in deadly fashion the attack on seniority, makes date of birth a probable source of danger, and arrays one officer's age against another's seniority.

Boards of Selection must soon, perforce, set a precedent and establish a policy. Shall this officer who is senior and well fitted for promotion, but who will not retire for a year or two, be passed over by that officer who is junior and equally well fitted for promotion, but who if not selected will be retired at once?

The question may be rendered more intricate by making the junior officer unusually able professionally.

Seniority has still great strength and behind it lies tradition. It is and has been a foundation stone of discipline, and may not be handled carelessly without injury to discipline.

Those on the eve of retirement will not be without an argument or two, and besides they will be better advertised, the catch word of the advertisement being the insistent "If we are not promoted now at once, we will be lost to active service."

Their strongest plea will be for selection at once on the ground that the younger, though lineally senior officers, will have another opportunity the following year or years. The easiest way out is to let seniority decide. The naval public is schooled to the privilege or right of seniority and to the misadventures of undue age. Still it does not require any great amount of foresight to predict some remarkably close decisions. Intense interest is also predicted.

A policy having been determined by the Boards of Selection, will the service be in agreement, and will it be so patently equitable that even those who suffer thereby will submit with good grace? For therein lies the fate of the law. It is history that personnel laws not favored by the service are sooner or later repealed. A very few embittered and determined officers have greatly modified legislation, under conditions, however, very much more favorable to such action than they are now. The present system to endure must prove that it is founded on right, its execution must be just, and lastly, it must produce an efficient navy at reasonable expense. And this time the demand for an efficient navy is going to come, not only from within the navy itself but from additional sources, perhaps with sufficient strength to override all other considerations. From the foregoing it is clear that the real test of the Selection Law has not come. But it has been operating for six years, a sufficient experience to fulfil or confound much of prophecy and criticism rife since 1916.

One generality of the scintillating kind, which, by its cleverness and seeming aptness, was given wide circulation and gained many followers, was to the effect that the element of competition could not be introduced into a co-operative institution. There seems to be more of truth in this one, "Willing co-operation is necessary to effective competition." Obstructionists are readily

known, and neither before 1916 nor since, do they stand well with inferiors, equals, or superiors. They always harm themselves more than anyone else, which is simple justice, if they act with deliberate intent. They seldom or never act so; it is a matter of temperament.

There was or is another prophecy more seriously meant; that initiative and forceful independence of thought and action would be killed, and that a marked tendency toward subserviency and even boot-licking would result. Inferiors seem to be as difficult as ever. Their mannerisms of mentality and of performance of duty are not the less pronounced. They are still truly loyal in that they are persistent and skilful in endeavoring to maneuver superiors into doing things according to their ideas. Those so disposed get sulky sometimes, if not successful, just as they did in 1915. Subserviency and pride were never bedfellows, and pride is trained into all naval officers. There is the thorough execution of an unwelcome duty or of an ill-considered order, which is due to conscious pride in discipline, and is in no way akin to subserviency. Those who lick boots were born that way.

The admitted truism that it is detrimental to the service to retain therein officers who have been "passed over" becomes of less and less importance every year now. In a very few years the great majority of officers failing of selection will be retired within the same year.

Criticism of the fallibility of the Boards on Selection has so far been destructive only. Nothing is offered as a substitute which is not open to error in the same degree, except lineal promotion.

Written records are imperfect, service reputation is not always accurate; both may be so constructed that comparisons of relative efficiency are impractical. Admit these things, yet exact justice cannot be done by any human agency, and if it were done by the gods, never-the-less it would be harshly questioned by man. All of these arguments with others not yet to the surface will be brought up by those in the service who attack selection whether they speak of the officers, a minority group, or for themselves alone.

Granting that errors are made, it makes no great difference any way who, within large limits, remain on the active list of

the navy; sad individually, but of no serious import to an institution composed of indoctrinated units. It is of great importance, however, that for the active list of the navy, there be healthy promotion in rank, in pay, and in successive details to duty.

If Naval Academy classes would only die off after graduation in the precise ratio of the percentages in the several grades within the proper age limits, then the problem of officer personnel would totally disappear. Naval Academy graduates are not so obliging. Some must be cleared out artificially, so that those who remain do so under conditions favorable to most efficient development. That is the situation in a nutshell. Selection is a misnomer. It is elimination that has been practiced in the navy, and it is difficult to see how any process other than elimination may be employed in the future. This with due regard to the troubles certain to center about Selection Boards.

The navy has been expanding since "99." That expansion, the "Plucking Board," public and Congressional interest in the navy aroused by our entry into the arena of nations in 1898, all served to produce and to increase efficiency. Everybody remembers the distressingly dead period between the abolition of the "Plucking Board" and the passage of the 1916 Bill. This at a time, in the shadow of impending war, when the navy, the American people, and Congress were nervous and acutely aware of the need of urgency in naval preparation. The navy felt these things first and most strongly, and though so stimulated, the stoppage of promotion in 1913 caused a distinct lowering in morale.

Now the armaments of the great powers have been limited, and while the personnel of our navy should be increased to place us on an officer parity with England and on a 5-3 ratio with Japan, it is clear that with such increase, the halting of naval personnel expansion will have come, not to be begun again until another world catastrophe.

The limit in personnel having been reached, its character and quality will become of primary consequence to the navy and more than ever before to our country.

That interest in character and quality takes widely different forms among naval officers. Some honestly think that it is necessary for the efficiency of the navy that they themselves re-

main in the service, even if their particular cases are marked exceptions to law or custom.

Others think that the righting of their wrongs, real or imagined, is of paramount importance to the navy, and so perhaps it would be if such wrongs were inflicted by a tyrannical and iniquitous system. It has been stated that laws may bear upon public servants with hardship, but never with injustice. No institution great or small, public or private, is free of both injustice and hardship. The injustice is seldom studied and hardship is the common lot. As a matter of cold fact the navy would not miss any of us more than a day, and would gladly rid itself of those of us who will take our wrongs and injustices and ourselves and bury the lot outside of the service. The provocation should be extreme, the wrong basic and apparent, before any officer is justified in making a monkey wrench of himself in the navy personnel machinery.

The opinion of the service has been the controlling force eventually in personnel changes, therefore much of menace to the law of 1916 will come from within the service. Congressmen will be badgered and hectored and pulled this way and that. Under such circumstances, in matters in which public knowledge is small and interest little, Congressmen naturally take the line of least resistance. The line of least resistance in this case is lineal promotion. It is cheaper in money and is a sedative or an opiate to naval officers, most of whom quiet down to wait patiently for death or for retirement with flag rank. Fights in Congress for radical changes in the law, for a little improvement here, a slight departure there, may lead not to the purposes announced but to promotion by seniority.

On the other hand there are signs which tend to prove that the navy is no longer a subject in which "public knowledge is small and interest little." And Congress will stiffen against disruption of personnel to the extent that this is true and no further.

Those familiar with conditions know of course that the Personnel Act of 1916 was not that originally proposed by naval officers and by the Navy Department. Naval officers gave their best to it. Congress had the wisdom to accept good advice but changed in various ways the Department's ideas. The people of the United States, however, facing war with anxiety over the

state of the navy, passed the bill. On the whole it is a good bill.

Right now, circumstances are most favorable for widespread and increasing concern over the navy.

With or without the pretense of isolation our country stands forth the greatest in all history. Courted, swamped with adulation, cursed and reviled, besought and bedeviled, respected, honored, and loved, despised, feared and even hated, by a restless and unhappy world, ours is the pomp and the glory and the certitude of power. That state and its maintenance are the pride and the duty of every American citizen. Even the Christians who pray for Armenia, and Prohibitionists who pray for a twelve-mile limit, know that when ministers of state have anything to say they say it with battleships, not with flowers, no matter how soft the tone, or honeyed the words.

Never before has the navy been so widely known as now. Every country and every hamlet has its quota that crossed the Atlantic under naval convoy and on naval transports. In general, knowledge of the navy is not unmixed with gratitude. Public understanding of naval matters was well exemplified in the fight over last year's appropriation bill. It is almost time to say that they who touch the navy, touch the people. Aware of keen popular scrutiny, Congressmen may not listen so complacently to malcontents within the service. Their natural bent if absolutely uninfluenced is like all other civilians, toward selection. Every one would like to see selection applied to other organizations or to the other fellow, and the more Spartan-like the severity and rectitude of its application, the better. It is only when the personal element is introduced that modifications and qualifications appear worthy of consideration. Civilians in both a social and business way live theoretically at least under selective conditions, and understand the principle thereof. Those who come in contact with the military services learn that seniority is sacred; they sometimes become impatient with its tenets, but hesitate to condemn it. Greatly impressed as they may be by the respect accorded to, and the evident importance of, seniority, still to outsiders it remains rather vague and mysterious and they fail to grasp its true inwardness.

The very term "selection" has great and favorable publicity value, and the average Congressman will be for it if other factors, including cost, neutralize each other.

He may not, however, be unalterably for selection by nine flag officers. He may for instance be for selection, present law unchanged otherwise, by the Secretary of the Navy, or by political agency.

In making his decision on the question he would probably be confronted by this set of facts:

1. Dissatisfied naval officers are persistently lobbying for a setting aside of the Selection Law in their particular cases, or for a repeal of the Law as a whole, they being individual beneficiaries in the terms of repeal.

2. His fellow members of Congress, the newspapers, and the man in the street are keenly attentive, and are insistent upon a highly efficient officer personnel.

3. A return to lineal promotion would result in a very inefficient officer personnel and would therefore conflict with (2) above, unless the numbers in the higher grades are vastly increased, the cost of which is prohibitive.

It would be entirely reasonable for that Congressman to conclude, and vote accordingly, that the navy was incapable of self-government in the matter of promotion, and that therefore selections for promotion should be made by a duly designated body not composed of naval officers. Any selecting agency operating under present law, will result in an efficient navy, but the most efficient navy will undoubtedly be produced by the best qualified selecting body. That is the Board of Nine Rear Admirals.

Efficiency due to intelligent upkeep, timely repairs, and disposal of cluttering waste, costs money, naturally. But that cost is very small compared to the final loss when operating without upkeep or repairs and choked with refuse.

For the next eleven years, as a glance at the retirement columns of the tables will show, the cost of forced age in grade retirement is negligible, in fact, it is not nearly so much as if the navy were promoting by lineal seniority, during the same period; because all officers who do retire for forced age in grade are Captains, who but for that retirement would become Rear Admirals retiring during service as Rear Admirals, or at the age of sixty-four with flag rank, at greatly increased retired pay.

These officers will all have from thirty-five to forty years of service on retirement at fifty-six.

Under promotion by seniority at least three times as many officers will retire with flag rank as will retire with that rank under selection. Now the retired pay of eighteen Rear Admirals yearly will offset the pay of quite a number of retired Lieutenant Commanders and Commanders. Able-bodied Rear Admirals on retirement are of little further use to the navy and the country. On the contrary younger officers, retired in health, are a reserve of great potential value which does not depreciate until age takes its toll of them likewise.

They become instantly available in time of war, and if the last war may be used as a measure, they are worth many times the money invested in them.

Really no argument can be built up to prove loss in men or money as a result of age in grade retirement. The navy will still have the men and may use them when necessary. It pays them for that prospective use; and it also pays them for the greatly increased efficiency of the active establishment as a result of their departure. Its recompense to them is an inducement for far-seeing young graduates of the Naval Academy to make the navy a life work. No such youngster is going to waste time on a profession which has no counterpart in civil life, with the possibility of being thrown out in the cold world at the age of forty-five, unless certain of some compensation for time lost. Assured of a reasonable income while learning new work, then, if the fortunes of selection go against him, he will stick, do his best, and take his chance.

If promotion stops in the navy, the navy stagnates. A method which provides a reasonable flow of promotion at very small cost, which is elastic and adaptable, and which has proven the soundness of its organization in the stress and strain of a great war, should by all means be retained.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DESTROYER EXPERIENCES DURING THE GREAT WAR

BY CAPTAIN J. K. TAUSSIG, U. S. NAVY

II. WITH THE QUEENSTOWN PATROL

In which are described the preparations made by the United States destroyers to participate in the hunt for the wily submarine; the manner in which the patrol was conducted; and some personal experiences while engaged in this duty.

PREPARATIONS

The first division of United States destroyers to be sent overseas at the beginning of the Great War arrived at Queenstown on May 4, 1917. The vessels comprising the division were the *Wadsworth*, *Conyngham*, *Porter*, *McDougal*, *Davis* and *Wainwright*. These little ships were of the 1,100 ton class; length 315 feet, beam 31 feet, and capable of making about 30 knots speed. Their large fuel capacity gave them a longer steaming radius than most British destroyers, so they were particularly well adapted for service against the submarines. Especially was this now the case as the German submarines had extended their operations farther and farther seaward, and were attacking merchant vessels as far out as three hundred miles off the entrance to the British Channel. This area was beyond the limits of operation of the large number of small patrol craft which, through lack of steaming radius and sea-going qualities, were confined to activities fairly close in shore.

During the three weeks just prior to our arrival the British had lost over one hundred and fifty ships. It was evident that this condition of affairs could not continue if the Allies were to win the war. The gravity of the situation had been brought home to us in more ways than one, and realizing how little we knew about submarine warfare, all hands set to in earnest to



VICE ADMIRAL SIR LEWIS BAYLY, K. C. M. G., K. C. B., M. V. O., R. N.
Commander-in-Chief, Coast of Ireland During the Great War

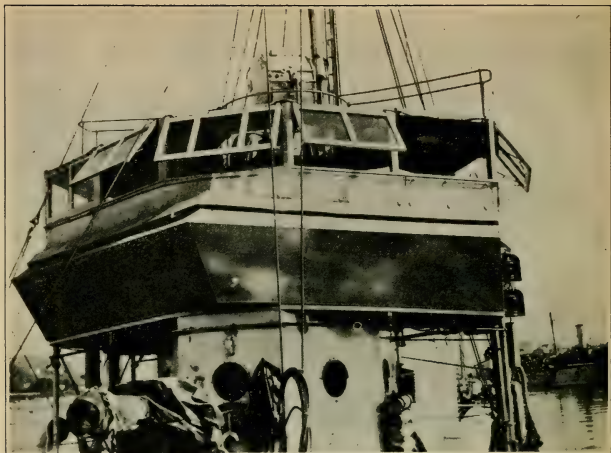
learn what we could, and to get our destroyers in the best possible shape.

Vice Admiral Sir Lewis Bayly, the Commander-in-Chief at Queenstown, had authorized four days for preparation. While for the first two days the commanding officers were more or less busy with official and personal calls and functions, everybody else connected with the United States destroyers, both officers and men, were working like beavers. There was so much to do and so much to learn in that short period!

My orders were to report to the British Vice Admiral, to co-operate with the British Navy, and to operate under orders from the British Commander-in-Chief. I had no knowledge of the situation, no staff of my own, no resources or stores, provisions, etc., excepting those at the Haulbowline dockyard. While all administrative control, including upkeep of ships, training of personnel, discipline, etc., remained in my hands as the commander of the division, the operative control was turned over to Vice Admiral Bayly. It was simply a case of my going to the Admiral and saying: "Here are six United States destroyers placed at your disposal, for the purpose of helping to win the war. I will keep them in the best possible condition as to material and personnel; we will go and do whatever in your judgment you deem proper." This principle of co-operation was followed and adhered to by all the American forces which operated from or at Queenstown as a base throughout the war. As the American forces grew in size we became an American Unit, with Admiral Sims as our Commander, operating in conjunction with British naval forces, under orders from a British Admiral. We were, from the very first, in a position similar to that which the armies in France finally took. That is, similar to the American Army under the command of General Pershing, and the British Army under Marshal Haig, both of which operated under orders from Marshal Foch in conjunction with the French Army.

The unity of command at Queenstown resulted in an efficiency of operation throughout the war which was beyond anything I had dreamed possible; and this example of co-operation between the navies of two nations has seldom, if ever been equalled in its smoothness and effectiveness.

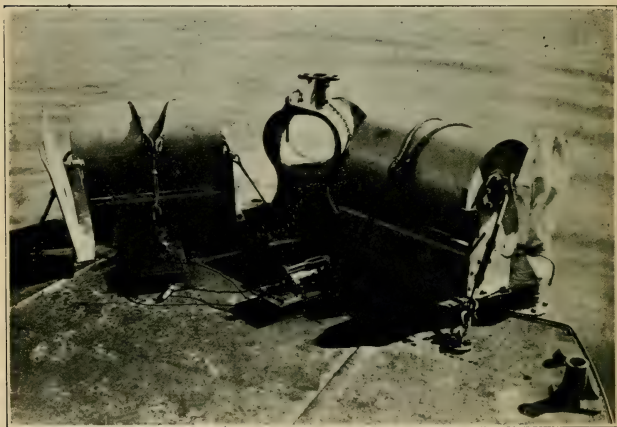
The British immediately put at our disposal all the facilities



Navy Official Photograph

U. S. S. "WAINWRIGHT"

Showing bridge after first overhaul at Liverpool. It was found that for efficient lookout duty the lookouts had to be protected from the elements.



Navy Official Photograph

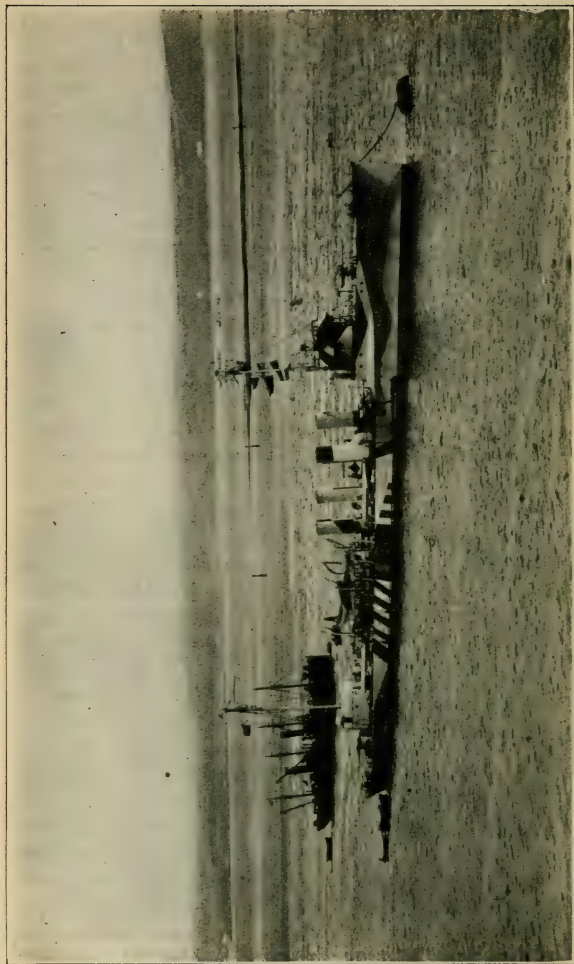
AN EARLY DEPTH CHARGE INSTALLATION

One of the methods used prior to the adoption of tracks.

of the Haulbowline dockyard. In addition there were detailed to assist us a corps of radiomen and signalmen. As we were to operate with British ships it was necessary, of course, that we should be able to communicate with them. So we put aside our signal and radio books, took up the British systems together with their confidential methods and spent four days of intensive study and training in signals and radio. A British signalman was detailed to each destroyer and there was signal drill twice daily. A British radio gunner was placed at our disposal and he held school on our ships twice daily. Signal officers, signalmen, and radiomen were intensively busy. It was remarkable the enthusiasm displayed and the amount of knowledge absorbed.

We were fortunate in having had detailed to us, as liaison officer, Commander E. R. G. R. Evans of the Royal Navy. Here was a real officer and a gentleman, young in years, old in experience, full of pep, and withal an unusually fine personality. He had been second in command of the Scott Antarctic Expedition and was awarded the Distinguished Service Order for his service there. When the Great War broke out he was lecturing in the United States for the purpose of raising funds to aid the widows and children of those who lost their lives in this expedition. Hastily returning to England, he had spent two years of strenuous and active duty with the destroyers of the Dover Patrol. Shortly prior to our arrival, his ship, the *Broke*, in company with another destroyer leader, the *Swift*, engaged six German destroyers in a night action. The *Broke* torpedoed one of the German vessels and then putting the helm hard over, rammed the next in line passing clean through and over her. For his brilliant actions in this engagement Evans was made a Commander of the Bath, and while with us at Queenstown he received a telegram informing him of his selection for promotion to the rank of captain. He was then just thirty-six years of age, and became on receipt of his commission the youngest captain in the British Navy. This temporary detail to Queenstown was made possible by the necessity for docking the *Broke* owing to damage done in ramming the German destroyer.

Captain Evans was indefatigable in answering the hundreds of questions that were put to him by the officers of our destroyers. All of us were thirsting for information, and we had found a



Navy Official Photograph

U. S. S. "WADSWORTH" AT QUEENSTOWN

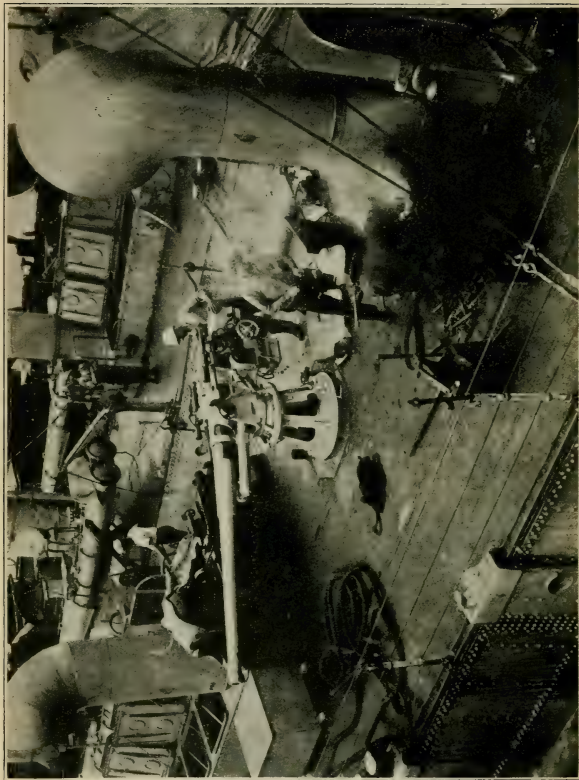
The *Wadsworth* was the first destroyer to be camouflaged, the design used being loaned by the British Admiralty. Contrast her appearance with that of her sister ship, the *Davis* in peace-time garb.

veritable fountain of knowledge in our delightful liaison officer. And one day we officers, that is, as many as could, assembled on the *Wadsworth* where Evans told us in a straight-forward and modest way of the night destroyer battle which had added so much to his fame. He then gave us the benefit of his experiences on patrol duty, after which he answered questions which prolonged the session into a three-hour meeting.

While the instruction for the officers, radiomen and signalmen was going on, the remainder of the personnel was as busy as possible. We were now doing the reverse of what was done at Boston. All the excess stores, equipment, and provisions which were put on board when we did not know where the next supply was to come from, had to be taken out and stowed in storerooms at the Haulbowline dockyard. We retained on board only a reasonable amount in excess of immediate requirements, as it was pointed out that a few inches less draft *might* save a destroyer from hitting a mine. Then our topmasts were housed in order that the range of visibility would be decreased. While this lessened slightly the sending range of the radio, it had its advantages in that the head of the lookout in the crow's nest, which was at the lower masthead, was the highest point in the ship. The lookout, if a good one, might possibly on a clear day be able to see a submarine before the destroyer was discovered.

The installing of depth charges was done by the dockyard force. Most of us had not even heard that there were such things. Yet they had been in use for quite a while. At this time only two charges were installed, the depth charge barrage not having been developed. This was probably due to the fact that the supply of depth charges was limited, there never being sufficient to provide the demand until after the United States began to manufacture them in abundance. The charges were secured on deck at the extreme stern, the detaching apparatus being hydraulic and operated by levers from the bridge. It took the full four days to complete the installation.

Another device which we had not heard of and which had to be installed on all vessels were the "fighting lights." These were a combination of red and green lights which could all be flashed together as an emergency recognition signal. They were used in the vicinity of both friend and foe when quick action was



Navy Official Photograph

GETTING READY FOR THE NEXT TRIP OUT. SCENE ON ONE OF THE 750 TON CLASS AT
QUEENSTOWN

necessary to avoid firing on a friend and to fire immediately on the enemy. Their adoption by the British and Germans was the result of both having fired into their own ships during night engagements.

In writing of these preparations for beginning our service on patrol, I must not neglect to tell about the most important of all. That is the considerate treatment and good advice received from Admiral Bayly. It can well be imagined that Sir Lewis might not have been pleased at having a bunch of foreigners foisted on him. But if he was not pleased he never showed it to any of us. I should say that insofar as any emotion was evident one way or the other he was absolutely neutral. From the very first he was kindness and consideration personified, but it was not until after our augmented destroyer force had been serving under him for some time, that the mutual affection which developed began visibly to show itself on his part.

Prior to sending us on our first patrol duty he sent for the six captains and gave us the benefit of his experiences and knowledge in a long quiet talk, in which he pointed out to us the trials and dangers which were in our paths. He did the same thing for each succeeding group of destroyer captains that came along. Commander J. F. Daniels, who arrived with the second destroyer division, was present at the talk to this group, and had the presence of mind to put down on paper just what Admiral Bayly said. It is worth repeating here in full, as the discourse gave, and now gives, better insight into the situation on submarine methods and their general mode of operating, than could be had in any other way. He said:

I have called you together in order to say a few things about the work ahead of you. I need not mention that our problem is a serious one. You are aware of that.

In two days you will go out on a war mission. When you pass beyond the defenses of the harbor you face death, and live in danger of death until you return behind such defenses. You must presume from the moment you pass out that you are seen by a submarine and that at no time until you return can you be sure that you are not being watched. You may proceed safely, and may grow careless in your watching; but, let me impress upon you the fact that if you do relax for a moment, if you cease to be vigilant, then you will find yourself destroyed, your vessel sunk, your men drowned.

To give an example of what constant vigilance will accomplish, I will tell you of the *Parthian*. This destroyer proceeded to sea. The night came on and just before nightfall a submarine rose to the surface of the sea 150 yards ahead. The watchful eyes of the crew saw her instantly; the watchful commander drove his vessel at her, and the watchful and ready gun's crew opened fire instantly. The submarine was struck eight or ten times in a space of a minute. Her tower was shot up, and she rolled over and sank at once. I cite this to show that in a space of perhaps two or three minutes a submarine was destroyed. If vigilance was lacking the opportunity would have been lost. You may go out day after day, week after week, and never see a submarine. Yet, when the opportunity comes, you must be ready. Therefore keep watch faithfully day and night.

Look out for yourselves—for a lucky shot, a chance shot may end your career.

It is my intention to send you out for a period of six days during which you will search out and destroy the enemy. You may then go into the port of Berehaven for two days for rest. Again proceed to sea for six days to act against the enemy, then return here for two days rest. This will be the program. Once a month, or say after five hundred hours of operation, you will be permitted to have a period of five days in which to overhaul your boilers and rest.

While at sea—beware of a periscope that is stationary. It may be a decoy with a bomb attached. You may be sure a submarine will not remain on the surface if you charge at him at fast speed. Therefore avoid a periscope that does not move. You may fire at it, first with a view of determining if it is a decoy and second it will test out your shells—the explosive character, how they act, etc.

If you come across survivors of ships sunk, beware of stopping to pick them up. If you thoroughly explore the area, and feel sure you are in no danger, it is permissible to pick them up. On the other hand, you must not risk the lives of your crew to save a few others. Of the conditions you must be the judge.

I may mention that some time ago the submarine, after torpedoing a vessel, sailed away for miles. Now they do not, but usually remain in the vicinity to loot the vessel if conditions are favorable. If you see a ship struck, or come upon one having been struck, be sure you go after the submarine. The rescue work must wait. You are to understand that it is your duty:

First—To destroy enemy submarines.

Second—To convoy and protect shipping.

Third—To save lives if you can.

To lose an opportunity to sink a submarine means he lives to sink other peaceful vessels and destroy more lives.

Do not try to tow a large vessel. You are not built for it. And never tow another destroyer unless you can get a convoy. It is fatal since you become slow and unmanagable and subject to attack.

Do not use searchlights—it discloses your position. If you do rescue work—do the best you can without lights. If you must use lights do not keep them on longer than necessary. And remember that even after you shut off the current, the carbons glow for an appreciable period. Therefore, as soon as you shut down your light, put a bag over the lamp to hide the glow of the carbons. On moonlight nights keep a cover on the searchlight, as the moon's rays may brighten the surface of the lens, and the reflected light reveal your position.

Do not permit matches to be lighted at night. You would marvel to know how small a flicker of light might show, and the distance spanned. The glow of light up through the hatches should be guarded against.

The areas of operation will be given you in the operation order.

Your speed must depend on wind and sea. Never make less than thirteen knots. And zig-zag always. Never for a moment neglect this. Your course must be irregular so that the submarine can not plot your position.

As to convoying—be sure to change course at break joint with the convoyed ship. That is—if the convoying vessel ahead of her turns to port the vessel convoyed should turn to starboard.

When you are hidden temporarily by smoke, haze, fog, or squalls, change course considerably and go back to base course several miles later.

The Germans are now using an inferior grade of torpedo. In the beginning many hits were scored and few misses recorded. This is now changed and many misses are being recorded. Perhaps the submarine commanders are taking pot shots. At any rate—many torpedoes miss. A German officer, taken from the water from a destroyed submarine, stated that they were now working out to 17° West longitude. It is their custom to use the sun as a blind, the submarine getting between the sun and the target. You, too, may utilize this idea. When a submarine sees a vessel, he steams away at speed of fifteen knots or more to gain position ahead. He then gets masts in line and submerges to occupy a suitable position. It is the endeavor to get within eight hundred yards at least as the chance of hitting at long range is slight.

When you are on patrol, do not patrol to end of area assigned and then to other end. Be sure to proceed irregularly so that the submarine may not establish your position.

Make signals short. Do not ask permission to get underway when you have in your possession orders to proceed. Your division commander will direct you as to the order of sailing.

When convoying, do not report the name of the ship frequently. That is—instead of reporting "The *Boston* is in company," say "The Convoy is in company." Of course it is understood that headquarters understands what ship you are reporting when *once* reported. Therefore do not repeat the name as the enemy may discover it. This applies to very valuable vessels and it is known that the enemy has special instructions to destroy certain vessels if possible.

Submarines frequently disguise themselves, using masts and sails and funnels. Do not be surprised at curious looking vessels, but investigate every one you see.

Watch fishing vessels, they may be submarines in disguise. If you shoot away a conning tower, do not be sure you have destroyed the submarine. Cases are known where repairs sufficient to return to port have been made by the crews.

Depth charges are harmful but not always fatal. You must get them close to the submarine to destroy her. When you return to port come and see me next day. If there should come up any difficulties come and see me. I want to straighten things out at once. We will handle matters frankly. This is all I have to say at this time.

As we were leaving Admiralty House the conversation became general. I do not now remember what led up to it, but the Admiral made this remark:

"The Admiralty is dreadfully afraid I may be rude to you young gentlemen. But I will be perfectly frank with you. If you do well, I will tell you so, and if you don't do well, I will tell you so."

We certainly could not complain of not knowing the ground on which we stood insofar as Vice Admiral Bayly was concerned.

The Admiral's address made an indelible impression on me as it undoubtedly did on all who heard it. Is it to be wondered that we followed his advice and instructions explicitly when these fateful words were impressed on us: "When you pass beyond the defenses of the harbor you face death, and live in danger of death until you return behind such defenses."

Surely we had seen and heard enough in our first four days' stay in Queenstown to appreciate the gravity of the work before us, and to realize that patrol duty in submarine waters was a dangerous undertaking.

ON PATROL

The American destroyers were to be treated in the same manner as the British patrol vessels, as was made evident by our first operation order which is given here:

ORDER FOR DESTROYERS,—AREA XXI

Admiralty House, Queenstown,
7th May, 1917.

30.

MEMORANDUM

Destroyers will be worked, as far as possible in the following pairs:

<i>Magic</i>	<i>Wadsworth</i>	<i>Sarpedon</i>	<i>Conyngham</i>
<i>Narwhal</i>	<i>McDougal</i>	<i>Mary Rose</i>	<i>Davis</i>
<i>Porter</i>	<i>Marne</i>	<i>Parthian</i>	
<i>Wainwright</i>	<i>Rigorous</i>	<i>Peyton</i>	

2. The principle areas on which it is intended they shall work at present are:

L.3, 4, 5. I.4, 5, 6. G.2,3. G.6, 7. U.P.R.6. C.3. A.4. M.4.

3. It will not be possible to man all these areas at once, but such areas will be occupied as the submarine pressure at the time requires.

4. An attempt will be made to work the destroyers six days at sea, and two days in harbor, ships leaving and arriving at 8:30 a.m. B.S.T.

5. When ships have done much full speed, chasing submarines, etc., they will not be able to remain out their full time, as they should start for home when two-thirds fuel short, if that event should occur before their six days is up, thus leaving sufficient fuel to chase a submarine when on the way home if such a chance occurs.

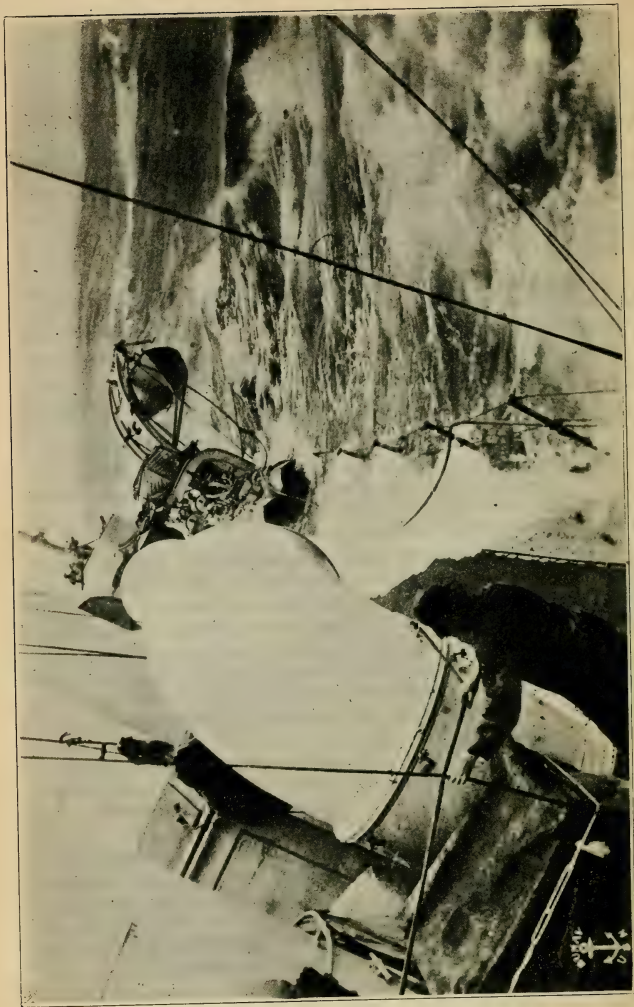
6. Shelter may always be taken on account of bad weather, serious derangement of machinery, or to save the life of a member of the crew, etc., without asking permission, but I should be informed as soon as possible so that the gap left open in the patrol may be filled up if necessary.

7. A program is attached as a beginning, it will doubtless have to be modified later. When shipwrecked crews are picked up they should only be brought direct into harbor if the captain has a special reason for doing so; otherwise they can be kept on board, the ship remaining on her patrol.

8. Submarines lately have nearly always returned to a torpedoed but floating steamer to get material out of her. Approach her with the sun at your back; be careful not to fire at the boats by mistake while at long range.

9. When you meet what appears to be a valuable ship escort her if the waters near are considered dangerous. If a "S. O. S." call is received and you think that you can be in time to help, go and assist her; but do not as a rule go over 50 miles from your area. Be careful not to ram boats to sink them as cases have occurred lately, when they have been left with bombs in them ready to explode when struck.

10. Senior officers of destroyers are to give the necessary orders as regards what speeds to cruise at, orders for zig-zagging, etc., as they know the capabilities of their ships best.



U. S. S. "PORTER" ROLLING IN A ROUGH SEA—AUGUST, 1917

11. When escorting, it has been found best as a rule to cross from bow to bow, the best distance being about 1,000 yards off; but this depends on the sea, visibility, etc.

12. Reports of proceedings are not required on arrival in harbor unless for some special reason such as sighting or attacking submarines; rescuing survivors, etc.

LEWIS BAYLY, *Vice Admiral.*

The area covered by the Queenstown patrol was a large one extending into the Irish Sea to the eastward, and as far as 20° longitude to the westward. For facility in assignments to duty and in reporting positions the entire area was divided into squares of about fifty miles each side. Each square was designated by a letter and a number. A destroyer might be told off to patrol one square, or it might have two or three squares to cover. There not being sufficient patrol vessels to cover the entire area, those sections were covered which the British Admiral considered the more important in accordance with the shipping that was passing through them or the information concerning the probable location of submarines. In addition to the outside patrol there were several in-shore ones shown on the confidential map as straight lines, and designated only by a letter. These patrols extended from Tuskar to Blaskets. They were important, as all the shipping, which was more or less scattered until the coast was reached, concentrated along these inside patrol routes.

In accordance with the operation order the six American destroyers put to sea for their first patrol duty on the afternoon of May 8. As soon as the swept channel five miles beyond Daunt lightship was cleared we stood out for our various areas. Immediately we began to see things! The *McDougal* opened fire on a dan buoy which the minesweepers had planted to mark the field of their operations. The *Porter* was close enough to see the shooting. Captain Wortman claims that he pulled out his watch, timed the firing, and that the *McDougal* broke all records for "misses per gun per minute." These dan buoys with their long, thin poles were very disconcerting, especially at first when everything looked like a periscope.

My ship, the *Wadsworth*, had not been long out of port when a lookout reported a periscope. Sure enough there it was, one of those little finger ones which we had heard about. Down we

charged on it, full speed. But it turned out to be a boat hook floating hook downward.

In order to keep a good lookout we always had one man aloft, two on the forecandle (belonging to the ready gun crew), two on the bridge, including a chief petty officer, and two on the after deck house. In addition everybody on the bridge, such as the quartermaster, signalman, fire control talker, kept lookout. The entire crew were instructed that no matter what they were doing they should immediately report anything that looked like a submarine or a periscope. The watch officers stood regular watch in three. At night, during the dark hours, (which were short at this time of year) either the executive, Lieutenant Everson (who was also the navigator), or I was on the bridge, in addition to the officer of the deck.

Of the four gun crews one was detailed for the lookout watches; the other three stood watch as ready gun crew day and night. There was always a torpedo crew at the tubes. In order that no one should have a watch oftener than one in three, the men of the messman branch, cooks, stewards, and boys, all stood lookout watch. If during those first four days of patrol duty there was anything afloat within the range of visibility that was not seen and reported, I should like to know what it was. We must have gone to general quarters on an average of at least half a dozen times daily, and the number of times the forecandle gun was manned cannot now be estimated. Captain Evans was a passenger on the *Wadsworth*. He had accompanied us to give advice and information, but I imagine that curiosity to see what an American destroyer was like was the chief incentive for his making the trip. After the four days during which he was routed out time and again by the general alarm, or by the scampering of the feet of the gun crew as they took their stations at the forecandle gun, he said to me: "Well, you certainly do keep a good lookout on this ship." Captain Evans had had two years' experience on patrol, so his ship had undoubtedly settled down to normalcy in regard to seeing things and going to general quarters. After a few tours of duty we also learned to discriminate between the imaginary submarines and the real ones. The general quarters alarm rang less and less frequently until finally it was the exception when the whole crew was unnecessarily aroused.

However, it is not to be wondered at, that we were a bit nervous in starting on this duty. We had heard so much since our arrival at Queenstown, and being new at the game, we were, of course, a little on edge. Then at this time the surface of the water through which we were patrolling was strewn with the wreckage of the large number of ships that had recently been destroyed. We would steam through miles and miles of this stuff, barrels, boxes, crates, lumber, wreckage, etc. Now and then there would be a big patch of oil spreading out a mile or more marking the place where some tanker had gone down. Open boats, usually empty, and now and then grewsome dead horses would float by. Then there would come an S. O. S. call from some ship beyond our station, or some patrol vessel would report picking up the survivors from such and such a vessel.

Several ships passed through the area to which the *Wadsworth* was assigned. These we accompanied to the limits of our beat, or until dark. While the merchant ship zig-zagged the destroyer "broke joints" by passing across the bow each time. When there was a patrol vessel assigned to the next area towards shore a radio would be sent asking to be met at the dividing line. If connection was made our charge was turned over to the destroyer, sloop, trawler, or whatever it might be. If there was no patrol vessel at hand when the limits of beat were reached, the merchant vessel had to proceed unaccompanied. In such cases when we parted company from our convoy it seemed that the vessel always had a sad dejected look as it steamed away by itself. But if we picked up a specially valuable ship, the patrol vessel stood by her until actually relieved. In some cases a destroyer would go a hundred or more miles beyond her regular area in order to protect the big ships.

At about eleven o'clock on the first night out while I was in the chart-house there was a terrific explosion which shook the whole ship. I rushed up on the bridge thinking the ship had been torpedoed. Everything was quiet and intact, the *Wadsworth* going along at high speed. The officer-of-the-deck had dropped a depth charge on what he took to be the luminous wake of a submerged submarine. Very rightly, he had gone ahead full speed, dropped the charge, manned the guns, and started the ship circling to again cover the spot. The explosion being our first experience,

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and coming at night, undoubtedly was considerably exaggerated in our imagination as to its effect on the ship. After circling for some time we decided that if there had been a submarine there we did not get it, and it was undoubtedly well on its way to other fields, so we continued.

While the *Wadsworth's* tour was only four days, the other destroyers were detailed for six and eight days. This was done in order that all of us should not be in port at the same time. On arrival at Berehaven after this four day tour, I was very tired. It seemed to me then that unless we relaxed our vigilance, which of course, was not desirable, or unless our personnel was increased, the schedule as laid down by Admiral Bayly would be too hard to continue indefinitely. According to instructions we were to be at sea for six days and in port for two. Captain Evans also thought this program was too strenuous, and on returning to Queenstown evidently told Admiral Bayly so, as the patrol periods were immediately reduced to five days. Later in the year, when more destroyers became available, the regular tours were made five days out and three days in. This was about the correct proportion if the personnel was to be kept prime for a long campaign and if the material was to be maintained in condition to stand the continuous service.

Captain Evans left us at Berehaven and returned to Queenstown where he remained only a few days before resuming his regular duties. Our two days at Berehaven passed only too quickly. Berehaven used to be a rendezvous for the British Fleets in the old sailing ships days, but during the war it was used only as an assembly point for patrol vessels, and salvage depot for torpedoed ships. This continued until 1918, when a division of our battleships was stationed there to stand by for German raiders, should they venture out. On our first arrival there were at least half a dozen torpedoed vessels resting on the bottom awaiting their turn to be salvaged. These vessels had been towed there by patrol vessels or salvage tugs, which were always standing by to go to the aid of any torpedoed vessel that remained afloat long enough to give it a chance.

We found quite a large army colony here, mostly casuals who had either been at the front and were having a rest, or who were recuperating from wounds or shell shocks. The British navy

was represented by Lieutenant Commander Sharp, R. N. (retired), who was Captain of the Port. He and his family and dogs lived in a pleasant little house on the shore near the anchorage, and here they dispensed delightful hospitality to the destroyer skippers whenever we came into Berehaven.

On the *Wadsworth's* return to Queenstown after our second tour we found the second contingent of United States destroyers in port, they having arrived the day previously. This division was under the command of Commander Charles E. Courtney, and comprised the *Rowan*, *Cassin*, *Ericsson*, *Winslow*, *Jacob Jones*, and *Tucker*.

Ten days later the third division under command of Commander David C. Hanrahan arrived. This division was made up of the *Cushing*, *Sampson*, *Nicholson*, *Cummings*, *Benham* and *O'Brien*.

Another ten days elapsed and the first division of "flivvers" (as the 750 ton destroyers are called in the force) arrived. These were the *Patterson*, *Paulding*, *Warrington*, *Drayton*, *Jenkins*, and *Trippe*. They were commanded by Lieutenant Commander John Henry Newton.

In the meantime the *Melville*, Commander H. B. Price, and the *Dixie*, Commander J. R. P. Pringle, arrived. The destroyers were gradually augmented until there was a total of thirty-five, which number composed the Queenstown force during the period of patrol duty which preceded the adoption of the convoy system. It was not until November, 1917, after the convoys had been in effective operation for some time, that additional destroyers augmented this force, and Queenstown began to develop into a base for mixed activities. Then the submarines, sub-chasers, aircraft, etc., began putting in an appearance. Queenstown ceased to be only a destroyer rendezvous insofar as United States forces were concerned, and developed into a large active operating base for all kinds of anti-submarine work.

The United States destroyers composing the force prior to November, 1917, together with names of the commanding officers are given here, being reproduced from an official list published at Admiralty House. These vessels were operating in conjunction with a number of British vessels, a list of which is also given, not only on account of the historical interest but also because of personal interest to those who served at Queenstown:

No. 2.

COMMANDER-IN-CHIEF'S OFFICE

Queenstown, August 28, 1917

SENIORITY LIST

Commanding Officers of U. S. Destroyers based on Queenstown

Distin- guishing Number of Destroyer	Ship	Name	Rank	Seniority
55	<i>Cushing</i>	D. C. Hanrahan	Commander	29-8-16
60	<i>Wadsworth</i>	J. K. Taussig	Commander	29-8-16
64	<i>Rowan</i>	C. E. Courtney	Commander	29-8-16
58	<i>Conyngham</i>	A. W. Johnson	Commander	29-8-16
66	<i>Allen</i>	S. W. Bryant	Commander	10-5-17
59	<i>Porter</i>	W. K. Wortman	Commander	15-8-17
52	<i>Nicholson</i>	F. D. Berrien	Commander	15-8-17
57	<i>Tucker</i>	B. B. Wygant	Commander	15-8-17
63	<i>Sampson</i>	B. C. Allen	Commander	15-8-17
54	<i>McDougal</i>	A. P. Fairfield	Commander	15-8-17
67	<i>Wilkes</i>	J. C. Fremont	Commander	15-8-17
43	<i>Cassin</i>	W. N. Vernou	Commander	15-8-17
44	<i>Cummings</i>	G. F. Neal	Commander	15-8-17
56	<i>Ericsson</i>	C. T. Hutchins	Commander	15-8-17
65	<i>Davis</i>	R. F. Zogbaum	Commander	15-8-17
53	<i>Winslow</i>	N. E. Nichols	Lieut.-Comdr.	17-8-15
49	<i>Benham</i>	D. Lyons	Lieut.-Comdr.	29-8-16
62	<i>Wainwright</i>	F. H. Poteet	Lieut.-Comdr.	29-8-16
68	<i>Shaw</i>	M. S. Davis	Lieut.-Comdr.	29-8-16
51	<i>O'Brien</i>	C. A. Blakeley	Lieut.-Comdr.	29-8-16
48	<i>Parker</i>	H. Powell	Lieut.-Comdr.	29-8-16
61	<i>Jacob Jones</i>	D. W. Bagley	Lieut.-Comdr.	29-8-16
38	<i>Jarvis</i>	L. P. Davis	Lieut.-Comdr.	29-8-16
36	<i>Patterson</i>	J. H. Newton	Lieut.-Comdr.	29-8-16
30	<i>Warrington</i>	C. H. Dortch	Lieutenant	18-6-10
23	<i>Drayton</i>	D. L. Howard	Lieutenant	1-7-11
34	<i>Walke</i>	C. F. Russell	Lieutenant	1-7-13
42	<i>Jenkins</i>	W. H. Lee	Lieutenant	1-7-14
22	<i>Paulding</i>	J. S. Barleon	Lieutenant	27-5-16
35	<i>Ammen</i>	G. C. Logan	Lieutenant	29-8-16
29	<i>Burrows</i>	H. V. McKittrick	Lieutenant	29-8-16
33	<i>Trippe</i>	R. C. Giffen	Lieutenant	29-8-16
27	<i>Sterett</i>	G. W. Simpson	Lieutenant	29-8-16
26	<i>Perkins</i>	F. M. Knox	Lieutenant	29-8-16
37	<i>Fanning</i>	A. S. Carpender	Lieutenant	29-8-16

No. 3.

COMMANDER-IN-CHIEF'S OFFICE

Queenstown, September 3, 1917

SENIORITY LIST

Commanding Officers of H. M. Ships Based on Queenstown

Ship	Name	Rank	Seniority
<i>Sloops</i>			
<i>Snowdrop</i>	George P. Sherston	Commander	30-6-17
<i>Myosotis</i>	William C. O'G. Cochrane	Acting Comdr.	30-6-07
<i>Jessamine</i>	Sidney A. Geary Hill	Acting Comdr.	30-9-11
<i>Camellia</i>	Reginald C. Richardson	Lieut.-Comdr.	1-4-13
<i>Crocus</i>	George M. Skinner	Lieut.-Comdr.	30-9-13
<i>Zinnia</i>	Graham F. W. Wilson, D. S. O.	Lieut.-Comdr.	29-2-16
<i>Bluebell</i>	Alexander Morison	Lieutenant	1-9-13
<i>Minesweepers</i>			
<i>Sandown</i>	Gervase W. H. Heaton, D. S. O.	Acting Comdr.	31-12-11
<i>Meynell</i>	Stafford H. Dillon	Lieutenant	1-10-09
<i>Hurst</i>	James E. Symons	Lieutenant, R. N. R.	2-8-15
<i>Southdown</i>	William D. Bayne	Lieutenant, R. N. R.	1-9-16
<i>Eridge</i>	John D. Hindmarsh	Lieutenant, R. N. R.	10-12-16
<i>Epsom</i>	Edward J. Dawes	Actg. Lieut., R. N. R.	19-6-15 (Sub. Lieut.)
<i>Cottesmore</i>	Henry J. Olover	Actg. Lieut., R. N. R.	6-8-15 (Sub. Lieut.)
<i>Cattistock</i>	Ralph Tatham	Actg. Lieut., R. N. R.	21-5-15 (Sub. Lieut.)
<i>Special Service Ships</i>			
<i>Aubrietia</i>	John L. Marx, C. B., M. V. O., D. S. O.	Captain, R. N. R.	16-11-14
<i>Bogonia</i>	Basil S. Noake	Lieut.-Comdr.	22-6-05
<i>Acton</i>	Clive N. Rolfe	Lieut.-Comdr.	30-6-14
<i>Cullist</i>	Salisbury H. Simpson, D. S. O.	Lieut.-Comdr.	1-4-15
<i>Laggan</i>	Charles J. Alexander	Temp. Lieut., R. N. R.	10-9-14
<i>Tamarisk</i>	Ronald N. Stuart, V. C., D. S. O.	Lieutenant, R. N. R.	1-9-16
<i>Penhurst</i>	Cedric Naylor, D. S. O. (Temporarily)	Temp. Lieut., R. N. R.	19-12-16
<i>Heather</i>	Harold Auten	Actg. Lieut., R. N. R.	2-8-15
<i>Viola</i>	William T. Thomson	Temp. Actg. Lieut. R. N. R.	16-10-16 (Sub. Lieut.)
<i>Miscellaneous</i>			
<i>Colleen</i>	Francis M. Leake	Commodore 2nd class (Chief of Staff).	22-6-11
<i>Adventure</i>	George F. Hyde	Captain, R. A. N.	1-4-17
<i>Safeguard</i>	William T. Hicks	Acting Comdr.	11-2-15

An interesting and amusing feature connected with the United States destroyers was the difficulty of the British officers in discriminating between the names of the destroyers and the names of the commanding officers. This of course was due to the fact that all our destroyers are named after deceased naval officers. It is not surprising that there should be this difficulty on the part of our associates when it is considered there was a destroyer named *Davis*, two commanding officers named Davis; a destroyer named *Allen*, a commanding officer named Allen, etc. Instead of being called by our last names, each captain was often called by the name of the destroyer he commanded. For example, to many, I was personally known as *Wadsworth*. Some of the British officers always called Commander Wortman, "Guinness."

One day I asked, "Why?"

"Well," they said, "you see he is 'stout' and he commands the '*Porter*.'"

PATROL EXPERIENCES

Admiral Bayly had pointed out to us that we might go out on patrol, "Day after day, week after week, and never see a submarine." This actually happened to some few of the destroyers, but to others the sightings of submarines were more or less frequent occurrences. It should be remembered that during these days of the patrol the submarines did not have much to fear from the destroyers unless they were come upon unawares. This was a difficult thing to accomplish as the submarine had the great advantage of seeing the destroyer before being seen. The submarine commander then had the choice of staying under until the destroyer passed out of sight, or he could with impunity show himself provided the distance was great. In fact the submarines occasionally did allow themselves to be sighted, but always disappeared before the destroyer got close enough to do harm. Their tactics in this matter changed after the convoy system was adopted and after there were sufficient depth charges to develop the barrage. The great value of the destroyer on patrol, was its ability to keep the submarines down at times when it was necessary for them to be on the surface, in order to make successful attacks on merchant vessels.

Undoubtedly on all destroyers that took part in the submarine chase during these early days there were a number of false

alarms. We were all attacked by fish at night, such as when a large fellow coming direct for the ship, leaving a luminous, phosphorescent wake, made one's heart rise to his throat and instinctively forced the command, "Hard right! Full speed ahead!"

Then there were the floating objects, buoys, etc., that from a distance were taken for periscopes. The fin of a shark was many a time so mistaken. In fact there were so many periscopes and submarines seen that I never considered a report authentic unless more than one person saw it; but always took action as if the U-boat was really present. On one occasion on a very clear day early in our patrol experiences the lookout aloft reported two periscopes, supposedly the double ones of a submarine. They were not at first sighted from deck. But full speed ahead was rung up and the ship headed in the indicated direction. In a few minutes we on the bridge saw the supposed periscopes. They were the stumps of the masts of a derelict that was hull down!

We soon came to know that many of the S. O. S. calls sent out by merchant ships were false alarms. If the men-of-war on patrol could mistake many things for periscopes or submarines, it is not to be wondered at that the merchant ships should do the same thing; and they were taking no chances. The tactics of these ships was to turn away at full speed and loudly call "S. O. S." on the radio.

The first submarine sighted on the *Wadsworth*, that we know was a submarine, was mistaken for a drifter. These fishing boats were frequently encountered in certain areas, especially along the inside patrols. They carried a small sail aft to keep themselves headed into the wind while fishing with drift nets out. On several occasions on hazy days we had passed one or more of these vessels, at times mistaking the sail for the conning tower of a submarine. And when a submarine was actually sighted we thought at first its conning tower was the sail of a drifter. As usual the guns were manned, but when the command to open fire was finally given the submarine disappeared at the same time, and no shots were fired. Of course all hands were much disappointed. We spent several hours in the vicinity looking for its wake in the hope of getting a chance to drop our two depth charges,—but no such luck came to us.

On our next patrol following this incident the *Wadsworth* was

ordered by radio to meet the British Hospital ship *Karapara* which was returning from Gallipoli with sick and wounded, and bound for Bristol. It was necessary at this time to escort hospital ships as the submarines had recently torpedoed two of them. The two nights we were with the *Karapara* were beautiful moonlight ones, permitting the high white sides of the big ship to be seen for miles. It was uncomfortable duty. With a sigh of relief we parted company a few miles from Bristol at four o'clock in the morning and started back for our patrol station. It seemed to me that I had just lain down on my bunk in the chart-house when the officer of the deck called through the speaking tube: "Submarine on the surface!" The engine room telegraphs rang for full speed ahead as I rushed to the bridge. It was just daylight, the atmosphere was unusually clear, and there on the horizon about six miles away was the submarine. Of course she had seen us, so I was determined that this submarine should not get down without being fired at. The forecastle gun commenced firing at 11,000 yards. No sooner had the first splashes appeared near the supposed submarine when to our consternation she commenced to make smoke, flash a searchlight, and make other signals. Our submarine was the British patrol boat *P-14*. None of the eight shots fired at this great range had hit her, but they came close enough for her to know that she was being made a target of.

P-14 and *Wadsworth* steamed toward each other and, when close enough to pass the time of day, both vessels stopped. The following conversation then took place:

P-14: "I say, I wish you would take a good look at us."

Wadsworth: "We are very sorry we fired at you, but we mistook you for a German submarine on the surface."

P-14: "I say, I am sorry I stopped you on your way."

Wadsworth: "Oh that's all right; goodbye!"

P-14: "Goodbye, old top!"

The *P-14* was one of the first patrol boats built to be used as submarine decoys. They were designed to look like submarines from a distance. Later on the *P* boats were constructed to resemble small merchant ships.

In reporting this incident to Admiral Bayly his comment was: "Such things will happen in war. I am glad *P-14* was not hit."

During one tour we saw what we took to be the same submarine

three days in succession. On the first two days the *Wadsworth* was proceeding seaward for the purpose of meeting certain designated specially valuable ships, to escort them through the area where this submarine was operating. The sub disappeared both times before we had the opportunity of firing at it, and we had no time for remaining in the vicinity. The third day we were in company with the Cunard liner *Aurania* when the foretop lookout reported, "Submarine on the surface bearing three-two-five." It was one of those rare clear days when things pop up, over the horizon. We immediately rang up full speed, headed in the direction of the submarine, and, at the same time, signalled the *Aurania* to head south. Not only did we make the signal by semaphore and international flag hoist, but also repeated it by radio. The liner continued peacefully on her way as if nothing unusual was going on. It was evident that the submarine had sighted the large steamer's masts before the destroyer's top had come over the horizon, and was proceeding to get in position for attack. Judging from the way the *Aurania* acted, the submarine would have succeeded had not the *Wadsworth* been along. When we on the bridge raised the submarine she was standing at high speed on a course to get the *Aurania's* masts in line. We could make out her conning tower and two guns. By this time she must have seen our bridge, but we were still hull down. It was essential that the submarine be forced down as, owing to the *Aurania's* disregard of our signals that vessel was in imminent danger. So as soon as the submarine could be seen through the sights on the forecastle gun the order, "Commence firing" was given. Five shots were all that were required to force him under. The *Wadsworth* remained in the vicinity until all danger was passed, and then rejoined the convoy.

I was provoked that the *Aurania* had ignored the signals to change course, so running close aboard hailed her, saying:

"Why didn't you change course as directed by signal and radio?"

The reply came back: "Was that a submarine you were shooting at?" And that was the only answer we got.

But actual contacts with submarines were not the only exciting and interesting episodes in connection with the patrol duty. For instance there were the mystery ships with which we worked in conjunction. It is not my intention to tell how these ships

operated, as that has been done by others; but there are one or two incidents which may prove of interest, as showing the many different phases connected with these fascinating ships. During our first stay at Queenstown we had been let into the secret of these ships, or *Q*-boats as they were generally called. We were shown two of them fitting out. One was a sailing ship and one a merchant tramp steamer. So we knew of their existence and had been instructed concerning what action to take in case of an "S. O. S." coming from them. The general rule was that so long as they used their merchant ship distinguishing call we were to keep clear no matter how persistently they called for help; but as soon as they resorted to their special man-of-war call it meant that help was immediately wanted. While the *Wadsworth* on several occasions picked up the "S. O. S." from these ships, assistance was never required by any that was near enough for us to aid.

One day early in the game, while proceeding quietly along on our patrol station, we sighted a merchant vessel, which was immediately approached in accordance with the custom. This was an unusually trim looking vessel as far as lines were concerned, but otherwise could create no suspicion. As we closed she hoisted the Uruguayan flag and we made out in large letters on her side, *Maldonado-Montevideo*. Running close aboard we hailed, asking where from, where going, and what cargo. To which came the reply from the grey haired skipper: "From Montevideo bound for Liverpool loaded with wool." Deciding she was not big enough to escort, the *Wadsworth* resumed her patrol. On our next arrival at Queenstown I was surprised to meet the master of the *Maldonado*. That ship was a *Q* boat (one of the converted sloops), and was returning to Queenstown when we spoke her. Of course before she arrived there, probably during the night after our meeting, she had painted out all references to Uruguay. The captain, a retired naval officer, then in the reserve, was very much pleased and amused at the way he had fooled us.

Survivors, like submarines, were rarely seen by some destroyers, and frequently encountered by others. During my entire stay in the war zone, both while performing patrol duty and escort duty, the ships I commanded only picked up one boat load of survivors. These happened to be from one of the British mystery

ships which had been sunk without getting out an S. O. S. It was at nine P. M., just at dusk, when the officer of the deck sighted a small sailboat dead ahead. Then the sail disappeared and we thought it was a submarine, with sail set, submerging. Full speed ahead was rung up with the intention of ramming. On getting closer we saw it was a boat, the crew of which had furled sail on seeing the destroyer approach. Remembering the admonition of Admiral Bayly about risking our ship in picking up survivors, we circled the boat a couple of times and then slowed sufficiently to hail them while passing. We were informed that they were from H. M. S. *Paxton* which had been sunk by a submarine about 3 p. m. on the previous day, and that no submarine was then about. So we ran alongside, and three officers and eight enlisted men, all in merchant crew garb, climbed up our side. Needless to say they were pleased to be on the deck of an American destroyer, after being thirty hours adrift. The senior officer was Lieutenant Gregor MacGregor of the Naval Reserve. He had been the executive officer of the *Paxton*. A paraphrase of his story is as follows: "The *Paxton* was proceeding on her route at about 8 knots when a submarine appeared and commenced to shell her. A bluff was made at trying to get away, lots of smoke, but no extra speed, etc. The submarine closed and pretty soon her shells commenced getting uncomfortably close. The captain of the *Paxton* lost patience and opened fire on the submarine with the stern gun. The submarine evidently concluded that the *Paxton* was a trap and disappeared. The crew of the *Paxton* were then sent over the side and painted the name of a neutral ship and country in large letters. Just as this was finished a torpedo struck without warning, and, while the panic party was carrying on, a second torpedo struck, the ship sinking in a very few minutes without having an opportunity of sending S. O. S. calls. The submarine took the captain prisoner and disappeared."

Lieutenant MacGregor, who had received a bad cut over the eye when blown overboard by the second torpedo, took charge of the two boats and one raft on which the survivors had assembled. He was evidently more or less dazed, as instead of keeping his three units together, he decided to sail ahead in search of help, leaving the other boat (with no sail) and the raft to

proceed together. His boat had been separated from the others about twenty-four hours when we picked it up. They had a very hazy idea as to their position, estimating that they were about 100 miles from shore, while in reality they were over 150 miles from the coast. It being dark there was nothing we in the *Wadsworth* could do that night towards finding the remaining survivors, so acting on the information given by Lieutenant MacGregor we proceeded to the estimated daylight position of the other boats. From there a search curve was run during the whole of the following day. It was then blowing half a gale, the sea was rough, and our especially vigilant lookouts failed to see anything of the boat or raft. Seven days later, after terrible hardships, what was left of those in the boat and raft, landed on the Irish coast. They reported that they had twice seen our masts in the distance.

This incident is only one of the many that occurred where survivors from torpedoed vessels, left to themselves in open boats a hundred miles from shore, failed to make contact with any patrol vessel, and by sheer pluck and endurance finally made their way to land. And the strange part about it was that these same men, as soon as they recovered, were ready again to take their places on the merchant ships, and do their bit to help win the war. It was not an uncommon thing for patrol vessels to rescue survivors who previously had been torpedoed one or more times.

The identification of ships, both at day and night, by means of radio signals or actual visibility, led to many interesting, and sometimes amusing experiences. The *Wadsworth*, like all patrol vessels had her share of these. One case in particular shows how careful some of the merchant skippers were before announcing the position of their ship. In May, 1917, while on a regular patrol tour, I received special instructions to meet the *Orduna*, which was listed as an unusually valuable ship. Information had been received that this vessel was bringing across the first regularly organized American Hospital Unit. In order to effect the meeting, a radio message, in code of course, was sent to the *Orduna* requesting position, course, and speed. For a half hour there was no answer. I became impatient as it was essential that the information be had in order to insure contact. Request for a reply was sent. When finally received and decoded it read:

"Please spell out the name of your ship in code."

So back goes the answer: "*W-a-d-s-w-o-r-t-h*," each letter coded as requested.

Another long wait, and then from the *Orduna*:

"What is the name of your paymaster on board, friend of Doctor Twigg?"

This seemed strange to me as the destroyers did not usually carry paymasters, and ours, Lieutenant White, had reported on board only a few hours before we sailed from Boston. But I immediately gave the answer: "*W-H-I-T-E*."

Then the *Orduna* gave her position, and in a few hours we joined company. The rail was lined with the men and women of this Cleveland, Ohio, organization, and I remember the enthusiastic waving of handkerchiefs and small flags that greeted our appearance.

Eight months later I heard this story from the *Orduna* viewpoint: It was told at a dinner in Boston where one of the doctors who was on the *Orduna* at the time, and I, were guests together, never having met before. Nor did he, when he told the story, know that I had been the captain of the destroyer. This is what he said as near as I can remember: ". . . Then when we were nearing the submarine zone a call from a ship came asking for our position. The captain did not know there were any American destroyers across, and as the wireless was sent with the German spark instead of the British, he was afraid that perhaps a submarine had obtained the code from a torpedoed vessel and was laying a trap for the *Orduna*. There was considerable discussion as to what was best to do and the name *Wadsworth* fell on the ears of Dr. Twigg, one of the members of the unit. The Doctor went to the captain and said: 'Several weeks ago a friend of mine in the Navy, Paymaster White, told me he had been ordered to a ship named *Wadsworth*. He said he didn't know anything about the ship or what it was going to do.' Then the captain sent the message asking for the name of the paymaster, and when the answer came back, White, he was satisfied that he was not dealing with a submarine."

The *Wadsworth* remained with the *Orduna* for over forty-eight hours, not parting company until well inside the Irish sea. At ten o'clock at night, it then being dusk, we ran close alongside, from which position I informed the captain that there was a light

showing through one of the forward air ports, shouted "good-bye," and we disappeared in the darkness.

The reference to the German spark used by the American destroyers was due to the fact that all our ships were at first fitted with only the "Telefunken" system which was the same as used by the German submarines. This worried the merchant ships considerably, especially up to the time that it became common knowledge that the American destroyers were operating in the submarine zone. Later all of our destroyers were fitted with the quench gap which was the same as used by the British vessels.

The night work was very trying, especially on the inside stations where there were more patrol vessels, and more ships passing through certain confined areas, than were found farther out. For the patrol craft the risk of collision was much more imminent than that from a submarine. This was not so for the merchant vessels as their speeds were generally less and, on account of their size, they could usually be seen at much greater distances, thereby giving them more opportunity to maneuver to avoid collision. There were not many of the first thirty-five destroyers that, at some time before the war ended, did not have a more or less serious collision. At night when an object is first seen, the difficulty in distinguishing what it is and how far away it is, is great. Especially is this so on very dark nights, no moon, overcast, but clear atmosphere. This fact was vividly brought to my notice by an incident which occurred considerable time after we had been operating without lights, and when we were accustomed to picking up ships at night. It was on a night like that just referred to, atmosphere very dark but clear. As was customary I was sleeping in all my clothes, on the bunk in the chart-house, when aroused by the call through the speaking tube: "Submarine on the surface!" followed by the rush of feet as the fore-castle gun crew took their stations. We had always thought that our one best chance for getting a submarine was to fall in with one suddenly at night, and resort to ramming. Here evidently was the chance. Ensign Norman P. Earle was officer of the deck. He pointed out to me the small black spot saying excitedly:

"Captain, it's a submarine, I can see it's higher in the middle than on the ends—shall we open fire?" The gun's crew had picked up the spot and were waiting the word. The ship was now rushing along at close to 25 knots.

"How long has it been since you sighted this?" I asked.

"It must be nearly a minute now—I'm sure it's a sub," was the reply.

"Better not open fire yet," I said. "If it's a sub it should either be submerged by this time or we should be on top of it right now."

Fire was not opened. The dark spot got bigger and bigger. Soon through my night glasses, I could make out the high sides, two smokestacks, and four masts of a large steamer. We went close enough for me to recognize our old friend the White Star liner *Adriatic*, a vessel something over 600 feet long! Such were the difficulties (and disappointments) of night work in the patrol areas.

But with all the uncertainty of the thing, together with the occasional excitement and interesting episodes, there was a great deal of monotony about the patrol. There were many days when our bright lookouts saw nothing that could give us a thrill. There were many days of discomfort when, owing to rough seas, the excessive rolling of the ship made eating off tables impossible, and sleeping in bunks difficult. The howling of the wind through the rigging had the tendency to get on one's nerves after several continuous days of it. Most of us slept in our clothes, not removing them during the tour of duty. One captain was taking a bath when a submarine was sighted and the general alarm gongs rang. It is rumored that he stopped bathing. One day while visiting with that delightful officer, Commander Shershton, of H. M. S. *Snowdrop*, he made mention of getting a call at night and going on the bridge in his pajamas.

"Do you mean to tell me," I said, "that you take off your clothes at night?"

"Certainly," he replied. "When a call comes I throw on a dressing gown, and up I go."

"How long have you been doing this duty?" I asked.

"Nearly three years," was the answer.

"Well," I said, "when I have been doing this patrol duty for three years, I am going to put on my pajamas too."

I had then been at it for just three months.

The patrol duty was quite different from convoy duty. When the change was made we no longer steamed around for days at a time by ourselves. Thereafter, we always—or nearly always—had company. But of that, later.

(To be continued)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

MERCHANT MARINE PERSONNEL AND NAVY INTEREST

BY F. E. CROSS, MASTER MARINER, LIEUTENANT COMMANDER,
U. S. N. R. F.

The question, not infrequently discussed, as to the type and nationality of the officers and men of the American Merchant Marine, is a subject of interest, doubtless, in naval as well as in commercial circles. Since, in the event of war, the Navy looks to the Merchant Marine as a means of reinforcing certain branches of the Service by enrolling merchant officers and men in the Naval Reserve Force, an insight into the qualifications of our merchant seamen, particularly as applied to deck and engineer officers, would seem of manifest importance and worthy of careful consideration on the part of all interests affected.

In a Merchant Marine such as is that of the United States, where the percentage of native born is extremely small, it should necessarily follow that the underlying causes of the existing defect be more definitely known and appreciated, and an endeavor made to apply such subsequent measures as the problem might require.

Throughout the country during the past seven years, the rehabilitation of the American Merchant Marine has been ardently advocated by all factions of the people. Within this time great numbers of ships of every known type have been launched from our shipyards and we possess the bulk of the former German and Austrian interned fleet. Since the termination of the World War, the amount of American merchant tonnage in commission has been exceeded only by that of Great Britain.

As a stimulus to the successful operation and perpetuation of our merchant marine, the United States Shipping Board adopted a policy of tremendous scope. They organized lines of trade

routes encircling the earth, established agencies in all the important foreign ports, and secured concessions for the installation of fueling stations at home and abroad. In addition to these activities and in a spirit of co-operation with our rapidly growing fleet and foreign trade, large American Banking Corporations succeeded in placing branch offices at propitious points along the world's trade routes.

The question of merchant marine personnel, during the World War period and immediately following, loomed as an exceedingly important factor. With the call for American ships there simultaneously was heard the call for American crews. The press of the entire country made an endeavor to induce young Americans to take to the sea, and the Shipping Board offered generous encouragement through a well organized Recruiting Bureau.

The result of these commendable efforts, broad-casted at large from the Atlantic to the Pacific, attracted several thousand young men to the Merchant Marine. But it proved effectual for a short time only. After making a voyage or two, the young recruits, unfortunately, left our ships as eagerly as they had signed on, so that today we have less than five per cent of American born men in the forecastles of our merchant ships. And this percentage is continuing to decrease, due, in part, to the gradual readjustment of wages to a pre-war basis.

There is no denying the fact that the American laboring man can do better ashore, financially and prospectively, than he can do afloat. Moreover, he finds life on land decidedly more agreeable to him than life in a ship's fore-castle, notwithstanding the advantages to be gained by a seafaring life, as depicted by the Shipping Board in their recruiting campaign. "Seeing the World" from the fore-castle of a merchant ship has proved rather a sad disillusionment to many an American boy. The Merchant Marine, unlike the Navy, which is a military organization on ship-board, demands a continual grind, during working hours at least, on the part of its ships' crews. In short, the work is laborious and the number of men required in each department for the running of the ship is reduced to a bare minimum. There is no organized play and living conditions are not quite so pleasant as some of our enthusiastic advocates for a merchant marine have pictured. Although there is an improvement in fore-castle life over that of former years, there likewise is an improvement in

the living and working conditions of all classes of labor on shore. Our young men are fully cognizant of recent changes made for the benefit of the laborer, both ashore and afloat, and after giving life in the merchant service a fair trial, they have left our ships, as has been done before in the nation's maritime history, and have sought employment more to their liking elsewhere.

But this revelation need give no deep concern. We can face the future very complacently with naturalized Americans and foreigners in the forecastles of our merchant ships. Observe, for instance, the industrial plants on shore. Do they not get highly satisfactory results with foreign labor operating under American officials?

In a similar fashion we need Americans in our merchant marine; not necessarily as seamen, firemen or stewards, desirable as that may be, but particularly as officers, on the bridge and in the engine room. And these men should be, upon the whole, born Americans, thoroughly trained and otherwise fully qualified for the many responsibilities incumbent to the position of ship's officer.

The directing staff of a steamship line are confronted with many problems, the answers to which require a fine sense of discrimination and judgment. There are ever new issues to be met, antiquated Navigation Laws to adhere to, innumerable costs and rates to figure, and a host of other demands of incalculable significance in a vastly complex organization; chief among which is the responsibility for procuring efficient ship captains, officers and crews.

No ship owner is likely to depreciate the fact that the safety of passengers, ship and cargo rests primarily with the ship's personnel. Nor can it truthfully be gainsaid that the earnings of the individual ship will be in proportion to the general efficiency of the men who sail the ship. Therefore, in the selection of ship's personnel, there is embodied, in no small degree, the three vital elements in successful ship management, namely: safety, earnings, efficiency. Which makes plainly manifest the serious need of highly competent seamen to command and officer the ships of our merchant fleet.

At the time of the World War there was a dearth of American ships' officers. We now have a great excess, even if the entire merchant fleet were placed in commission; American citizens all,

who have successfully passed the governmental examinations, and thus are legally qualified to fulfill the manifold duties attached to the berths assigned to them.

One of the duties that devolves upon the United States Steamboat Inspection Service, operating under the Department of Commerce, is that of examining applicants for the positions of Master, Mate and Engineer, and of issuing licenses respectively.

For many years past we have been informed, and truthfully so, that the examinations as prescribed by the Steamboat Inspection Service for the various grades of ships' officers and masters, are much less rigid than the examinations required by competing maritime nations for similar positions. Apropos to this condition is the equally well-known fact that the majority of our ship's captains and officers are foreigners born and bred, but possessing naturalization papers. It is very true that among these naturalized citizens there are many thoroughly competent men in their profession who, in a long and faithful service, have proved a credit to the American Merchant Marine. But it is equally true that most, by far, of these officers are of a different stamp who have failed to secure for themselves an education. In many instances they have extreme difficulty in the use of the English language. They are amazingly ignorant of our history and our National Civil Government. And there are comparatively few who possess foreign certificates of competency as officers; which, in itself, gives one an insight into their actual standing on board their home country ships.

Not that these worthy citizens have committed an infraction of our laws or regulations. On the contrary, credit is perhaps due them in that they have been properly solictious to their personal welfare in taking advantage of the lenient requirements of the Steamboat Inspection Service, in order to become licensed ships' officers and commanders. Qualified or unqualified, as you please, we have them in very large numbers and their average record, in brief, may be simply told.

In the majority of instances, this type of officer has served for some years in the forecastles of foreign ships. He then drifted into American ships where in the course of a stated time he obtained naturalization papers; and after a few weeks' elementary training in Navigation or Engineering School, or no school at all, sat for a simple examination which, upon passing, secured for

him a Third Mate's or Third Assistant Engineer's License. Thus, with the original license to his credit, the first step was taken and promotion would follow in due time.

The average merchant seaman of any nation is a true international. His calling makes him so because of his life spent at sea or abroad in many foreign ports. His sentiments are similar to those of his brother international on shore. He is free, unrestrained and contented with his surroundings; but his heart is with the land of nativity and breeding. Being an international, he does not feel deterred, nor does he entertain any feelings of compunction in becoming the adopted son of any nation that will give him the most satisfactory return for his labors. He realizes that, in the course of his career on the sea, under any flag, he may continue his rôle of international. So, in our American Merchant Marine, where officers' examinations are comparatively easy, salaries higher than in foreign ships, and the service very cosmopolitanized, he finds conditions that are highly agreeable to his interests.

Such outstanding characteristics of the merchant service in their general relation to the average naturalized American ships' officer, and the conclusions to be deduced therefrom, may be summarized as follows:

First: His sympathy and wholehearted patriotism are in the majority of cases, wanting. In peace he may be sufferable, but in war he may prove exceedingly dangerous.

Second: It is evident that he lacks the fundamental qualifications for promotion to a command.

Third: He exerts a deterring influence, consciously or unconsciously, upon American trained men who aspire to become ships' officers and commanders.

That these prevailing conditions are detrimental to the extreme and stand in sore need of remedy if the Merchant Marine is to perform its function as a thorough-going American institution, no one is likely to deny. Therefore, in consequence of this condition and having in mind a high plane of loyalty, efficiency and reliability to establish and maintain, it would appear of the utmost importance that future masters and officers be the product of American Schools and training, insofar as is consistent and possible.

The three State Nautical School Ships on the Atlantic Coast are giving young men the necessary elementary training, in a two years' course, to fit them for positions as petty officers and, later on, as officers on American ships. Although these splendid schools have been in commission for many years, comparatively few of the graduates have risen to command. The cause of this rather extraordinary state of affairs is not far to seek. It is found, for instance, in the large foreign born element among the captains and officers of our ships, who often-times look upon the young American officer as an interloper; in the simple examinations that tend to lower the status of the ship's officer; and in the mistaken preference for the foreign-born officer, which some of our American Steamship Lines have indubitably practiced.

The sea-faring profession is a highly honorable calling. Now, as in days past, the "men who go down to the sea in ships and do business in great waters" are confronted with a diversity of duties and living conditions that form a marked contrast with life on shore. In peace we may say our merchant seamen are the links in seemingly endless chains of communication with foreign lands. In war, like the Navy, by reason of their relation to her, they are their country's first line of defense, in that they are, or should be, Naval Reservists. At all times, on ship-board, the watches follow one after the other unceasingly and each officer and man is assigned to his particular station. In command of every merchant ship is the captain or master.

The position of commander of a seagoing ship, whether naval or merchant, is one of unique distinction, as well as of large responsibilities and many anxieties. Backed by laws long standing, he rules supreme on board the vessel under his command. He is the sole arbiter and all on board look to him as to a court of final appeal. He is frequently called upon, both ashore and afloat, to make decisions involving great gain and loss or possible disaster. Upon the high seas, his officers and men accept his judgment, good or bad; and they obey his orders, right or wrong. When, at a critical moment, the master's order proves to be right, the crew undemonstratingly triumph; if wrong, they suffer, or perhaps, perish with him.

As the principal agent of the owners on board his ship, the master's knowledge is ever likely to sway advanced opinions in

reference to his charge. The owners look to him, not only to sail his ship, but to correct all faults; maintain discipline on board; promote economy and efficiency in the general upkeep; expedite despatch to and from ports; and observe such demeanor and diplomacy at home and abroad, as will enhance the owner's good name and reputation. The profession of ship master, in short, demands the best qualities in a highly capable officer.

That the Navy is vitally interested and at all times prepared to lend its influence in behalf of the betterment of the Merchant Marine, everyone knows. But alone, the Navy is powerless to promote so efficacious a result. In order to attain this desired end, we must look to the steamship lines to observe greater discrimination in the selection of officer material and in the subsequent promotion of officers to higher rank. Beyond that, however, we must look to the Department of Commerce, in whose close co-ordination and under whose rules and regulations the Merchant Marine is operated, to adopt more stringent measures governing the eligibility of candidates for officers' licenses, and to so augment the inadequate examinations as at present required, as will tend to reflect credit upon the American Merchant Service.

The world, today, stands upon the threshold of the keenest international competition in maritime history. To become a great maritime nation imposes as much responsibility on the Merchant Marine as on the Navy. The patriotism and efficiency of the naval officer must needs be supplemented by like qualities in the merchant officer. In this connection, therefore, let us be convinced that the Merchant Marine, like the Navy, will achieve distinction only in proportion to the caliber of its personnel.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

MANEUVERING AIRCRAFT IN FORMATION

BY THE LATE LIEUTENANT EDWARD L. ERICSSON, U. S. NAVY

This article was originally delivered as a lecture to new pilots joining the Torpedo Plane Squadron at the Naval Air Station, Hampton Roads, Virginia, in May, 1922. Lieutenant Ericsson attended the football game at Annapolis on October 21, having flown up from Hampton Roads with a flotilla of planes. He was killed on October 26, when a plane in which he and another officer were making a test flight dropped almost vertically from a height of 800 feet. The manuscript was received at the Naval Institute on the day of his death.

The article is thus of interest not only from the importance to aviation of the maneuvering of planes in formation, but from the fact that within a few days after the manuscript was sent in, Lieut. Ericsson gave his life to the development of aviation.

EDITOR.

At the present time there is very little information regarding the maneuvering of large numbers of naval aircraft. In the past, the flying done by the navy was largely limited to instruction and patrol work for seaplanes, and fleet spotting for land planes. This called for single plane flying, and so comparatively little formation work had been done.

Lately, however, naval aviation has broadened in scope. It is planned to have bombing, torpedo, spotting, scouting, and combat squadrons which will use both land and seaplanes. Gas attack, smoke screens, and photography will be used as auxiliaries. The possibilities are infinite, and call for large numbers of aircraft maneuvering and working together.

To do this expeditiously and efficiently, obviously requires methods of maneuvering, tactics, and communication, which are as simple as possible. Groups of aircraft will function in a similar manner to the various units of the battlefleet or an army. In action each will depend upon the other, and similar policies

and tactics will govern them all as far as the size, type, and design of these planes will permit.

Some thought must be given to this by everyone, and the information thus gained by thought and experience promulgated throughout the service. Such methods as have proved themselves efficient will become axiomatic, and the whole system can thus be built up step by step on sound tried lines. A beginning must be made somewhere, and it is with this end in view that the present elementary article on formation flying is written.

A great many formations have been flown by the Torpedo Plane Squadron. The methods which have seemed to be the best will here be outlined. Little claim is made to originality, for the experience and opinions of others are being used, and these, coupled with the results of a great many experiments and much practice, have determined the doctrine of the Squadron. No claim is made that these methods are the only ones by which similar results may be achieved. However, they have been carefully thought out and have worked successfully.

Primarily, an explanation will be given stating the reasons for, and the great importance of, formation flying, and why proficiency in this kind of flying is so essential an accomplishment to a pilot flying any type of airplane.

The effort of a number of planes can usually be co-ordinated best if they are maneuvered together. This is true of any kind of attack, bombing, or torpedo work. Similarly, in being attacked by an enemy, it is the best method of defense. Each plane, if a multi-place one, can defend the plane ahead, the plane behind, and itself by machine gun fire if it is in formation. However, if any plane strays from its formation it will become the easy prey for an enemy lurking behind a cloud or flying at a higher altitude.

Then too, the formation leader must have the planes near enough to him so that he can see them. It is even more necessary that they be able to see him and receive his signals and follow his movements in maneuvering, attacking, and retreating.

In bombing, particularly, it is necessary to fly certain types of formations, not only for the above mentioned reasons, but so that the desired pattern of bombs can be dropped when bombing a moving target, such as a ship or train. This is absolutely necessary to insure hits.

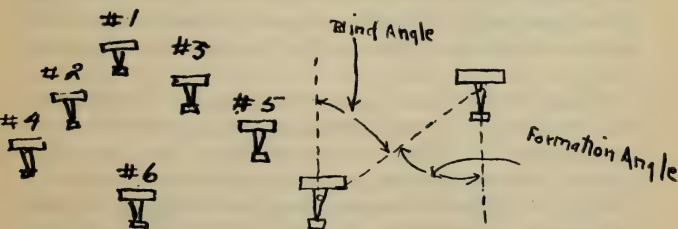
Another good reason for formation flying is one which has directly no military value. The pilot learns the "feel of plane" to a greater degree in formation flying than any other way. He learns absolute control of his machine. He becomes part of it and ceases to fly mechanically and by rule. There can be no skidding or slipping in formation flying.

After having explained why it is necessary to fly formation, the next question of how to fly it will be taken up. There are several factors which are necessary to do so properly.

The primary, and most important requisite, is a good leader. He must know how to direct the other members of his flight and to keep them together. He must be able to fly properly himself and know how to take advantage of the clouds and the sun. He must keep a weather eye out for enemy formations or decoys, so that he will not be surprised. His must be the eyes of the formation, and his is the responsibility for the safety, proper directing, maneuvering, and handling of the flight.

The second requisite is the absolute maintaining of the formation. Planes must be kept in position, both in a vertical and a horizontal plane. They must not stray and in case of one having to drop out, the next behind must immediately close up the gap. This is necessary for several reasons.

In case the formation is attacked, each plane defends not only itself, but the plane ahead and the plane behind. The blind angles of each plane are protected and covered as far as possible by the type of formation used. The greater the blind angles of the plane in front, the more obtuse will be the angle of the "V" of the formation.



MODIFIED DIAMOND FORMATION

Another reason for staying in position is that the leader can make his signals seen and understood. Visual signals from a plane are hard to understand anyway at best, and if the planes are not closed up the difficulty is augmented.

The third essential is a simple system of signals whereby the offensive and defensive qualities and possibilities of the formation can be most advantageously utilized. As has been stated before, signals of any kind are rather hard to receive, and for this reason, the Squadron Doctrine should determine largely the particular line of action in each individual case.

There are two methods of signaling and communicating in the air. The most positive, and the one most used up to this time, is visual signaling. Radio and radio telephones have not been developed to the point of reliability as yet, but they will undoubtedly be perfected in the near future, so that their use will be practicable and essential.

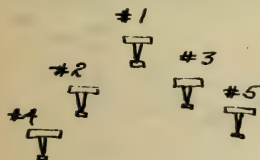
Visual signals can be made with the arms, by zooming the plane, by tipping the wings, by little hand flags, or by Very Pistol. For closing up and opening out, or raising and lowering the planes directly behind him, the leader can use his arms. The planes receiving this signal can pass it along to the rear. In forming, breaking up, landing, attacking, retreating, and for other more complicated maneuvers, the more unmistakable signals of zooming and tipping the wings are the best. In bombing, flags or a Very Pistol have been used quite successfully. However, the most positive way for the planes behind the leader to release their bombs at the proper time is to watch the fall of the bombs in the leading plane. For simple 90° or 180° turns no signals at all are necessary because it is very easy to see the leader go into a turn and follow accordingly. Very often, however, the leader will raise his right or left arm for a turn and raise it again when he straightens out.

In large planes, where it is possible to carry a radio operator who can spend all his time operating the set, marked success has been attained in all kinds of communication. It is necessary, however, to have a good set and an operator who is experienced.

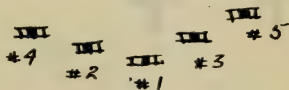
The fourth factor in formation flying is a knowledge by all hands of the chain of responsibility. In case the leader finds it necessary to leave, the command should pass along to the next man, and all

of the members of the unit should be so indoctrinated that each can take up the leadership competently, and carry out the mission properly, along the lines which were planned, and that there is no question in the minds of any, who the leader is. This calls for a complete understanding and co-operation of each individual pilot. The minds of all should function along similar channels, and the mission and the procedure in carrying it out be so well understood by all that a change of leadership will affect but little the morale of the flight or the resultant effort which is the mission.

The type of formation flown is usually "V" or some sort of diamond. The largest number of planes that can be maneuvered by a single leader in one unit is seven or eight. Even that number is somewhat unwieldy to handle quickly. A five or six-plane formation is about the handiest of all. The "V" is used for an odd number of planes, whereas with an even number, one plane will fly directly behind and below and thus make a modified diamond.



"V" FORMATION FROM ABOVE



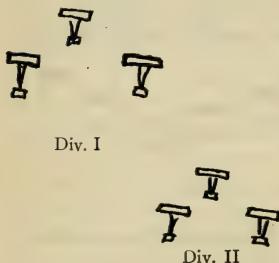
"V" FORMATION FROM THE REAR

In bombing a stationary or moving target, it is usually desirable to drop the bombs in some sort of a pattern. The factors which determine the shape of the pattern are as follows: (a) the type and shape of the formation, (b) the number of bombs carried, and (c) the time interval of dropping. The arc of visibility of the plane affects the shape of the formation because in some planes it is difficult for the pilot to see a plane ahead if it is at a lower level. In this case the following planes step down from the leader instead of up, as is usually the case.

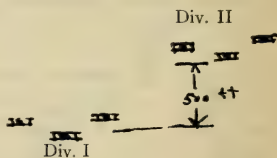
Planes fly above the leader for two reasons. First, the leader can see all of his formation better if they are above him. When planes are below he has to look down on either side of the fuselage, and this is difficult in any type of plane and impossible in some. The second, and even more important reason, is that a

plane can protect the tail of a plane ahead if it is flying above, whereas it becomes almost impossible if the rear plane is flying below. This applies only to single motored planes with fixed guns.

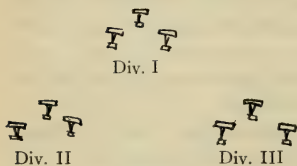
Where the numbers of planes to be maneuvered is more than eight it becomes necessary to form several flights, and to fly as a group. A group is rather similar to a single unit, that is, in echelon or "V" shapes. However, each flight is at a different altitude from any other. The best difference in altitude is about five hundred feet. The diagrams show these two methods. The angle of the "V" should be kept as acute as is possible without having the wing flights overlapping the leading flight. In other words they shouldn't forge ahead.



GROUP ECHELON FROM ABOVE

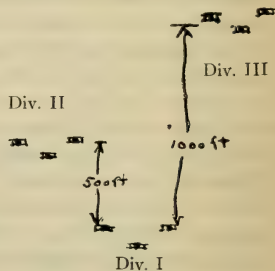


REAR VIEW OF GROUP ECHELON



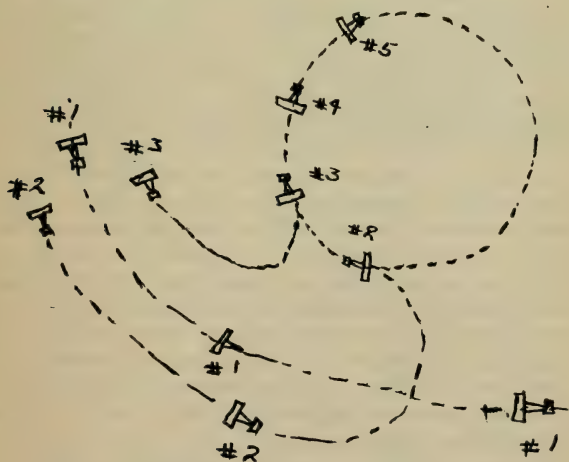
Div. II

Div. III



Div. I

In extended operations, the gasoline capacity has to be taken into consideration. Time and operations schedules must be followed according to the military plan. For this reason the actual forming and beginning of an operation must be prompt and expeditious. The quickest and best way to form a flight is to take off from the water or the ground in formation. However, it often becomes necessary, because of a restricted field or area of water, to have rendezvous over some designated spot. The best way to do this seems to be as follows: all planes, but the leader, will follow each other in a counter clockwise circle. Their order in the circle will correspond to their number in the formation. No. 2, who is second in command, will lead the circle. The leader stays outside of the circle at 100 feet lower altitude. He meets No. 2, who does a wingover or tight flipper turn and falls into place. The leader continues outside in a clockwise circle and picks up all of the other planes in a similar fashion. The diagram will explain this more fully.



LEADER COMING IN AT 100 FEET LOWER ALTITUDE

A group is formed by the leading flight picking up the other flights one by one in a somewhat similar fashion. Flights rendez-

vous over some specified area with 500 feet difference in altitude between flights. The leading flight will maneuver previously, so that it comes in toward the others at a converging course.

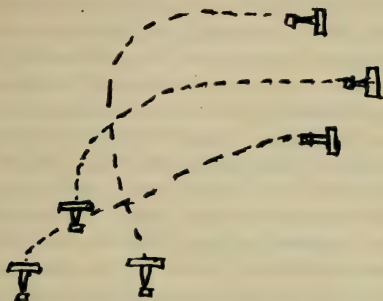
When the squadron has been formed, unless the radio communication is quite perfect, the flights following will each govern their movements by the leading flight. The mission of the group will determine, to a large extent, its action in the event of an attack or in being attacked. Generally speaking, however, all flights will follow the leader.

Maneuvers should be made as simple as possible, and should consist only of such movements as will expedite and make easy the handling of a flight group. Complicated movements only tend to cause confusion.

The first thing a beginner at formation flying learns is the making of ordinary turns. The inside turn particularly, while actually being the easiest to do properly, seems to be the most difficult, until the knack has been mastered. The leader goes into a turn making average cruising speed. He may or may not give a signal first, it matters little which. He must under no circumstances skid or slip. If he does so he will get out of position relative to the whole formation. The planes on the outside crowd in very slightly and increase speed so as to make up for the additional distance which they have to go and still stay in formation. The inside planes decrease speed materially and drop down below the level of the leading planes and "step down" in a similar manner to their "stepping up" on straight away flight. Thus the whole formation is banked and every plane is flying at a different level. This obviously prevents any collisions, or being in each other's way, or obstructing each other's view. When the leader straightens up, the inside planes pull up to position as before. The great tendency of pilots flying inside is to drop too low and to forge ahead. Sometimes it becomes necessary to almost stall the plane to stay in position. If any plane drops too low it forces the plane behind down also, and makes it difficult for all to get back up when flying straight once more.

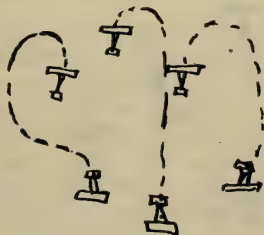
Crossover 90° turns are quicker than ordinary turns, but are, however, somewhat dangerous. The leader makes an ordinary turn as before. The outside planes dive under and come up into position. The inside planes simply cross over the outside planes,

and fall into position. The diagram explains it more clearly than words can.



No. 2 DIVES UNDER No. 3 CROSSES OVER No. 2

For a quick 180° turn, which would be used in a sudden retreat or in an attack from the rear, a renversement is the quickest. This can be done only with planes that can stunt. The leader does renversement to the right or left. The planes on the right flank each make one to the right in succession as soon as the plane ahead has completed its turn. The planes on the left flank do a renversement to the left in a similar fashion. After it has been practiced for a while each pilot will be able to judge when to start, relative to the plane ahead.



DIVISION REVERSEMENTS

At times a Lufberry, or Milling circle has been used by single seater planes as a defensive measure against attack by superior numbers. The principle of this is, that if all planes are flying in

a close circle at the same level, each plane will be able to protect the tail of the plane ahead of it. It is not as practical as it seems because it is rather difficult to keep a close enough circle. Then too, it cannot be moved quickly and the circle must be kept up until the attack has ceased or help has arrived. A straight away formation is much better for multiplaced machines. The Lufberry circle, however, is a very pretty maneuver and is done as follows: Upon a designated signal the last plane on the right flank does a wing over or right flipper turn to the right and continues in a circle, keeping the same altitude. The other planes on the right flank and the leader do the same thing. The planes on the left flank follow in behind the leader. The circle is tightened up by the first plane to turn, and the size is determined by the number of planes in the formation—the more planes the larger the circle. The flight is reformed by a signal from the leader. He can dive down through the circle and have the other planes fall in as best they can. The neatest way, however, is to have the leader give a zooming signal, and at the end of it he and all planes which were on the right flank in the beginning will do a wingover or flipper turn to the left. The planes on the left flank will merely ease in behind the leader. The leader should make less of a turn than the planes further back and if he throttles down, they will have little difficulty in catching up and getting into position.



LUFBERRY CIRCLE

All of these methods of maneuvering have become part of the Squadron Doctrine, and a word of explanation will be given to define the term. Doctrine means method, and indoctrination means knowledge of method. The personnel of the squadron must be indoctrinated into the squadron methods as soon as these have been evolved. This applies to every endeavor and every bit of work done by the squadron. As far as possible methods should be standardized with this end in view. Operation orders, flight formations, rendezvous, flying signals, beach procedure, division routine, officer-of-the-day duties, and a hundred other things should all be done in certain standard ways, which have been thoughtfully worked out, and proved by experience. Then after they have been learned, the issuing of orders will be very much simplified. The less supervision and explanation of details which is necessary, the more complete the indoctrination of the squadron. When the subordinate officers of an organization are properly indoctrinated it is only necessary for the commander to explain briefly the mission to be performed and the general method of doing it. His subordinates then merely follow the tried and accepted methods with which they are all familiar. The minds of all function along certain known and tried lines, and each man knows what he and the others are going to do, and how it is to be done. In the absence of the commander the mission can be carried out as well as if he were present, because his subordinates all know what he would have done were he there to direct himself.

Doctrine is so very necessary in formation flying. There must be a mutual confidence and understanding between the leader of a flight or group and his subordinates. Acts on the part of each, which are different from the preconceived plan, must be construed intuitively as being the right thing to do under the circumstances. When orders are not being carried out the leader should know that it is utterly impossible for the subordinate to do so. When the leader does something different from the plan, as conceived on the ground, the remainder of the flight must know that his reasons are sound, and that his actions are the best under the circumstances. The members of a flight must understand each other, whether things go right or wrong. When this becomes so, they have become properly indoctrinated.

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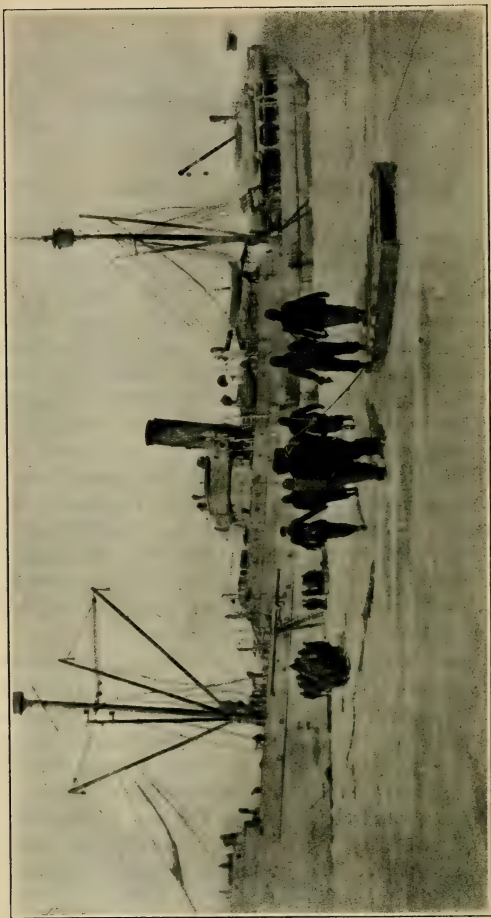
U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ICE SEAMANSHIP

LIEUTENANT COMMANDER FRANK LUCKEL, U. S. NAVY

The experience of the U. S. S. *Saturn* in the ice at Vladivostok during the winter of 1918-19 may be of interest, especially to those who encounter similar conditions. The *Saturn* anchored in the Bosphorus, off the Northern shore of Russian Island, on December 29, 1918. As cargo, she carried about two thousand tons of radio construction material. Her mission was to complete the partly built radio station which had been started on Russian Island by the old Czarist Government. At the time of arrival a small amount of light broken ice was floating in the harbor. This interfered but little with the operation of the ship's boats and considerable general cargo was landed during the forenoon of December 30. During the afternoon the wind began to blow from the North and soon drove in sufficient ice to make it impossible to operate the boats. When hoisted, the boats were found to have the planking along the water lines seriously gouged out.

The ice floes became larger on December 31, and prevented stores being landed. New Year's Eve the wind increased to a gale and drove huge cakes of heavy ice shoreward. New Year's Day broke clear and cold with the ship frozen in by ice about three feet thick. Heavy sleds with metal runners were built and used to transport both heavy and light cargo ashore. The regular course of the Russian ice breaking tug lay near the off-shore side of the *Saturn*. In time the ice on this side was loosened and floated away. The ice no longer supporting that side of the vessel, the *Saturn* tended to move away from the firm shore ice. Something had to be done if the ship was to continue to discharge cargo. Hawasers were laid out shoreward over the ice. Holes were cut in the ice and the hawasers made fast to



"SATURN" DISCHARGING IN ICE FIELD AT RUSSIAN ISLAND

cross-pieces of heavy wood which were placed at the bottom of each hole. When a strain was put on each line the cross-piece brought up firmly against the lower surface of the ice and the ship was breasted bodily in. The heavy shore ice served as a dock. At the time of laying out these lines the ship was moored by two anchors dropped with a good span.

Stores and heavy machinery were hoisted out by the ship's booms and hauled ashore on the sleds. The breast lines became slack every few hours and permitted the vessel to move away from the ice. This necessitated frequent adjustment of the lines if the booms were to plumb the solid ice. At first the cause for this was not apparent. Later it developed that the internal heat of the ship melted the ice as soon as it came into proximity with the ship's skin. This continuous breasting in eventually brought the vessel to a position from which the anchor chains tended broad off the off-shore beam. The tension on the anchors and the weight of the chain cables soon made it very hard to breast the ship in sufficiently to permit handling cargo. The melting of the ice about the bow and stern permitted the ship to surge ahead and astern under the influence of the wind and tide. It was decided to have an ice breaker make a lane into the heavy field ice and then place the vessel therein. Here she would be completely ice locked.

An ice breaker has a heavy clipper bow that rides up over the ice and the weight of the vessel serves to break the ice down. While waiting for the ice breaker to arrive the *Saturn* was tried out as an ice breaker. She was headed at slow speed for the ice field and as her bow entered the ice a crack appeared ahead. The ice field slowly parted but the ship's way was effectively checked before she entered very far. No further progress could be made using the engines at full speed ahead. Any attempt to force a way into the ice while moving at high speed would have seriously damaged the ship's structure. The ship was backed clear and anchored to await the arrival of the ice breaker when a lane was promptly made.

The *Saturn* steamed slowly down this lane until she brought up with solid ice ahead. The anchor was then dropped but the ice was so thick that it failed to penetrate and merely rested on the surface. Although the ship was surrounded by heavy ice,

hawsers were led out in all directions to furnish additional security. Each hawser was secured to a wooden beam at the bottom of each ice hole. Eventually the hawsers froze to the surface which made them all the more secure. The ice field remained unbroken so that no considerable strain was thrown on these lines. The ice melted for only a few inches from the ship's skin and the movement of the vessel was very slight. Beyond this the original thickness was not appreciably diminished.

It was so cold in the living compartments that icicles froze along the outer bulkheads above the water line. The sea water was twenty-eight degrees Fahrenheit. Since this was four degrees below the freezing point of fresh water some concern was felt that the reserve feed tanks under the engine rooms would freeze solid. A careful watch was kept on these tanks but the water never froze, probably due to the ship's internal warmth. Gravity tanks and fresh water pipes were kept from freezing by steam heating coils and insulation.

During the time that cargo was being discharged the weather continued extremely cold. When the hour of sailing approached the ice breaker had considerable difficulty breaking the heavy ice to permit the ship getting clear. When a passage had been broken the *Saturn* was partly towed and partly backed down the lane using a line to the ice breaker. When about half way out the tow line parted close to the *Saturn*. Unfortunately the line was a new hawser and the ice breaker decided to keep going with their end. We never saw our line or the ice breaker again. We were only half way down the channel and entirely dependent upon our own power. The engine was thrown at full speed astern. Naturally the stern tended to port and was fended off the ice as the ship moved backward. Large floating ice cakes were sucked under the vessel and occasionally the engine would slow up as a particularly thick piece was cut in two by one of the blades.

After much backing and stopping the relatively ice-free channel was reached. With a feeling of relief the ship was headed for Olongapo and the Chief Engineer told to make his best speed. He was surprised to find the engine turning out 110 revolutions while she had never made over ninety before. Upon investigation it was found that two adjacent blades of the single

screw were broken off at the hub. This casualty had undoubtedly been experienced in backing clear of the ice field. The loss of these blades did not cut down the speed to any appreciable extent and we entered the Dewey Dry Dock on the eighth day after leaving Vladivostok. Spare blades being on board repairs were soon effected and our experiences in the North were soon forgotten under tropical skies.

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THE SPIRIT OF THE OFFENSIVE—II

BY LIEUTENANT COMMANDER H. H. FROST, U. S. NAVY

VII. THE INFLUENCE OF THE COMMANDER

There have been innumerable instances where a single commander has inspired his men with the offensive spirit. Mr. Wells gives Alexander no credit, but it is a fact that of all his advisers, only Parmenio supported him in his plan to attack the Persian Empire, and throughout the numerous campaigns which followed, it was the driving force of their king which made the Macedonians eager for battle.

When Alcibiades rejoined the Athenians, they were being defeated everywhere by the Spartans and their fortunes were at their lowest ebb. Alcibiades took command of a dispirited fleet and infused such fighting spirit into it that victory after victory was won in rapid succession and Athens again regained the upper hand.

Lucullus made his wonderful march through Asia Minor and Armenia with a mere handful of men, whom, when he had assumed command, he found in open mutiny.

Sertorius by his resolute character made Spanish barbarians into such soldiers that he won a series of victories over the veteran Roman legions, commanded by Pompey the Great.

Gustavus, even before any of his victories, had inspired his army with the spirit of the offensive, and after he fell at Lützen, which battle had really decided the war, the Swedes lacked the resolution to march forward and win the fruits of the victory, but again fell back to the defensive.

In 1796, the French Army of Italy was in a wretched condition, lacking supplies and the desire to fight, and content with remaining on the defensive and holding on to their present positions. An unknown soldier of twenty-seven who had gained the command

by pure favoritism, created the most remarkable transformation in history and soon the soldiers were mad with enthusiasm and eager to be led against the superior numbers of the enemy. Bonaparte repeated this feat when upon his return from Egypt he raised France from the depths of despair and revived the old spirit of the Republic.

In the wars of the French Republic the Austrian generals and troops were, with the exception of Archduke Charles, noted for the defensive attitude they assumed. This was probably due to the fact that all their plans were drawn up by the Aulic Council and Vienna, and no freedom of action was allowed the commanders in the field. When Suvorof took over the command of the combined Austrian and Russian armies, he immediately changed both the manner in which the plans for the armies were made and the spirit with which they were imbued. The Aulic Council having presented him with a plan of campaign which was to end with the arrival of the armies at the river Adda, the fiery old general drew a cross over the paper and wrote at the bottom, "The plan will *begin* with the passage of the Adda and will end as God pleases." With such a leader it was easy for the Austrians to regain all Italy.

When Grant assumed the command of all the federal armies, Sherman wrote a letter to him, in which he showed the reason for Grant's successes in the West: "When you have completed your best preparations, you go into battle without hesitation, as at Chattanooga—no doubts, no reserves; and I tell you, it was this that made us act with confidence."

General Lee was often forced by his inferior numbers to act on the defensive, and it was only his inspiring personality which kept the fighting spirit of his armies intact to the very end of the war. A certain little scene after the Battle of Antietam must have had a remarkable influence on his troops. In accordance with his custom the general asked each of his division commanders to state the actual situation in his part of the line and to give his opinion as to the best plan for the future. All the reports agreed; the troops were exhausted; the losses had been terrible; the federal forces were overwhelmingly superior and had fought better than ever before; the situation of the army with a great river at its back was very dangerous. All agreed that a retreat across

the Potomac during the night was necessary to save the army. Even Jackson, the originator of the most daring plans, was forced to indorse the opinions of the other generals.

After listening to all the opinions of his officers, the general said in his calm voice: "Gentlemen, we will not cross the Potomac tonight. You will go to your respective commands, strengthen your lines; send two officers from each brigade toward the ford to collect your stragglers and get them up. Many have come in. I have had the proper steps taken to collect the men who are in the rear. If McClellan wants to fight in the morning, I will give him battle again."

At Port Arthur the arrival of Admiral Makaroff instilled a fighting spirit in the Russian Fleet based there; after he was killed, the Russians went back to their passive defensive.

VIII. THE NECESSITY OF MAINTAINING THE SPIRIT OF THE OFFENSIVE BY WINNING VICTORIES

A spirit of the offensive developed by the various measures which have been described must be maintained during war by victories in the field. There are only a few instances in history where the spirit of a nation has remained intact after a series of defeats. Thus Rome, after the great victories of Pyrrhus, would not consent to a peace on any terms as long as an enemy remained on Roman soil. In a similar way was their spirit maintained after the great victories of Hannibal, but in this case they were compelled to revert to a limited offensive for a number of years. Another instance of constancy in defeat was shown by the Russians in 1812; their defeat at Borodino did not take away their hopes of victory in the war, but even in this case, it will be noted that they gave Napoleon no further chance to catch them in the open field.

In all his early campaigns Alexander had been uniformly victorious, both in battle and seige. But at Arbela he wished to win a battle which would end the resistance of the Persians once for all. The evening before the battle he was urged to make a night attack, but declined, saying that he would not steal a victory. He did not do this out of chivalry, but of calculated policy. He wanted a victory in daylight in the open field, where his enemy would have all the conditions in his favor, so that he could

definitely prove to both his own men and the enemy that the Persians could not stand up to Macedonians, and that there was no use for the enemy to continue the war further.

Caesar during the Gallic Wars is said to have taken eight hundred towns by storm, conquered three hundred states, and defeated over three million men in battle. His soldiers believed that they were invincible. "He was," as Plutarch says, "so much master of the good-will and hearty service of his soldiers, that those who in other expeditions were but ordinary men, displayed a courage past defeating or withstanding when they went upon any danger where Caesar's glory was concerned."

The Battle of the Yalu was the decisive battle of the Russo-Japanese War in that it proved to the Japanese that they could defeat European soldiers in the open field.

IX. THE EFFECT OF EXHAUSTION

Even though there may be every external influence favoring the building up of a fighting spirit, there is one internal influence which may break down this spirit in time. This is the physical and mental exhaustion to which great leaders, and also veteran troops, are often subject. In 1805 Napoleon said: "There is only one time in life for war. I shall be good for six years longer. After that I must pull myself up." In 1809 his first failings became apparent and by 1812 he was no longer his old self. There is nothing remarkable in this when we remember that he usually went to bed at midnight and commenced work again at 3 A. M.

Suvorof said in 1791: "The time is short, the end approaches, six years and the juice will be squeezed out of the lemon." His last campaign was in 1799.

Hindenburg writes: "Many a time has the soldier's calling exhausted strong characters, and that surprisingly quickly. The fine intellect and resolute will of one year give place to the sterile imaginings and faint heart of the next. That is perhaps the tragedy of military greatness."

As Napoleon signed his abdication at Fontainebleau, he exclaimed bitterly to his marshals and generals: "You want repose, have it then! Alas! You do not know how many chagrins and dangers await you on your beds of down. A few years of this peace, for which you are going to pay so dearly, will kill a greater number of you than war, the most desperate war."

There are numerous examples of the exhaustion of military leaders, and in fact also statesmen, during the World War. It is believed to be a fact that no cabinet minister or commander-in-chief on land or sea of a European country served in these posts continuously throughout the war.

Exhaustion in war is not confined only to commanders, but also to veteran troops and seamen of the highest grade. The soldiers of Alexander, Caesar, and Napoleon practically mutinied on several occasions, because they wished to end the privations and dangers to which they were continually exposed, and incidentally to enjoy the riches they had won. In this war many armies of brave and veteran troops were so worn out by fighting that, while willing to fight a while longer on the defensive, they could not be induced to attack. Their offensive spirit had been broken. In such cases it will require every effort to build up the morale of the troops. The return of the Germans to the offensive in March, 1918, after having been on the defensive for years is a remarkable instance of the rebuilding of an offensive spirit. The German leaders deserve the greatest credit for this unusual accomplishment.

X. THE INFLUENCE OF THE PRINCIPLE OF SELF-PRESERVATION

Self-preservation is the first law of nature. It tends to induce a defensive spirit, rather than that of the offensive. Xenophon tried to combat this tendency when he said, "Whoever of you desires to preserve his life, let him strive to conquer."

In general, a nation will make greater efforts to put forth its full strength when it is fighting on its home soil than when it is carrying the war into the enemy's country. In the latter case, our armies are apparently successfully conducting their campaign and no particular effort seems necessary; in the first case, however, the entire nation realizes the importance of putting forth its maximum strength. It will be noted that the courses of most wars, and the World War in particular, have been marked by startling changes in fortune. This is caused by the fact that each nation, as its situation becomes desperate, makes extraordinary efforts to rectify it; then, as soon as the tide changes in its favor, the people become overconfident, efforts are relaxed, and the enemy is given a chance to rally.

In accordance with this principle we might have expected the

Germans to make another great effort to hold the Western Front in November, 1918; their chances of holding the front would have been increased because there would have been great difficulty for the Allied leaders to induce their people to continue the war after they knew the Germans wanted peace. The possibility of the Germans making a renewed stand was, in this case, decreased by the utter breakdown of their morale and the fact that the United States was as yet unexhausted by war and was continually pouring fresh troops into the battle.

In addition to this form of self-preservation, there is also frequently an improper desire to preserve our ships and men; this prevents the running of risks and tends to react against the spirit of the offensive. In the war it was a favorite form of propaganda to accuse the German commanders of heartlessly sending their troops to be mowed down by thousands by our fire. It was therefore somewhat of a shock to us to find that after the war the losses of the Germans were very much less than those of our allies. Napoleon's attitude when he said, "what are a million men to me," usually resulted in smaller losses than if he had acted with the greatest caution and had attempted to save the lives of his men and not win battles.

XI. THE DEVELOPMENT OF AN ORGANIZATION SUITED TO THE APPLICATION OF THE OFFENSIVE SPIRIT

Having set forth some methods by which the spirit of the offensive may be built up and maintained in a military or naval organization, it remains to see how the organization itself should be built up so that the maximum use can be made of the spirit of the offensive.

The spirit of the offensive is not a static force; it can be applied only with motion. Mobility is therefore a requisite.

There are four forces which tend to oppose the movement of fleets and armies:

1. The difficulty of coming to a definite decision, particularly when there is no information upon which to base it.
2. The inertia which must be overcome to put a fleet or army in motion.
3. The internal friction between the parts of the organization.

4. The external friction between the organization and the outside elements.

XII. DELAY IN MAKING DECISIONS

To carry out an offensive movement it is necessary not to follow the lead of an enemy when we are forced to take action, but to make a definite and original decision of our own to make the enemy follow our lead. This decision must be based on a consideration of the information available, which in war is usually inaccurate, always vague and sometimes conflicting.

There is no better example of inaccurate information than the report made by the officer of the British sloop *Wasp*, who daringly entered Cadiz in a Portuguese boat, to the effect that Villeneuve's fleet was in that port, when it actually had left seventeen days before and was then in mid-ocean. The arrival of this information completely changed the ideas of Lord Barham in the Admiralty. In fact, so much inaccurate information was received as to Villeneuve, that it was finally admitted that nobody knew where he was, but that it was suspected he had gone to India.

Plutarch cites a case of vague and conflicting information in describing the conditions in Rome when Caesar was advancing on that city: "Then again, it was impossible to have any good intelligence of the enemy; for what each man heard by chance upon a flying rumor, he would report for truth, and exclaim against Pompey if he did not believe it." The numerous and entirely incorrect reports of German submarines and bases in the Western Atlantic is another similar case. The conflicting information received by Jellicoe as he was making his approach at Jutland is an instance as regards tactics, as distinct from strategy.

Not many men have the power of making a definite decision even when all the facts are in their possession. It is manifestly much more difficult when the facts themselves have to be constructed and guessed at. Caesar was a general who had a reputation for boldness and quickness in making decisions. But even he hesitated a long time before making his fateful decision to cross the Rubicon. "He checked his course," says Plutarch, "and ordered a halt, while he revolved with himself, and often changed his opinion one way and the other, without speaking one word.

At last in a sort of passion, casting aside calculation, and abandoning himself to what might come, and using the proverb frequently in their mouths who enter upon dangerous and bold attempts, 'The die is cast,' with these words he took the river."

Hindenburg describes the doubts which assailed him and his staff during the Battle of Tannenburg: "The crisis of the battle now approached. One question forced itself upon us. How would the decision develop if these mighty movements and the enemy's superiority in numbers delayed the decision for days? Is it surprising that misgivings filled many a heart, that firm resolution began to yield to vacillation, and that doubts crept in where a clear vision had hitherto prevailed? Would it not be wiser to strengthen our line against Samsonoff? Was it not better to abandon the idea of destroying the Narew Army in order to ensure ourselves against destruction? We overcame the inward crisis, adhered to our original intention, and turned in full strength to effect its realization by attack. So the order was issued for our right wing to advance straight on Neidenburg, and the left enveloping wing to take up its position at 4 A. M. and intervene with the greatest energy."

In originality and boldness of decision our people probably surpass all others. With these native qualities to build on, our officers should be the most bold and self-reliant in the world. In order to insure that our leaders in war will have these qualities we should:

1. Train all officers in making decision in tactical games and chart maneuvers.
2. Continue this training in tactical and strategic problems carried out by the fleet.
3. Encourage flag and commanding officers to act with decision in their everyday work, and to this end allow them liberal freedom of action.
4. Select only men of known decision and resolution for flag officers afloat, and give these qualities first priority in their selection.
5. Surround these officers with loyal and resolute staff officers who will support them in their decisions.

XIII. INERTIA AND FRICTION

A great amount of inertia must be overcome to get a large naval or military force in motion. The mobilization of an army is one of the greatest tasks on earth. The movement of a fleet, while less difficult, involves many factors, where driving force is necessary to overcome the inertia and overcome it quickly. Some of these factors are: the writing of orders, their coding, transmission and decoding, the delays caused by improper interpretation of the orders, the preparation of ships for sea, including possibly their fueling and provisioning, the sweeping of channels for mines, the detail of air and surface craft for screening, the formation of scouting lines in advance of the fleet, and the various other necessary measures.

In *Sherman and His Campaigns* a description is given of the federal armies at the beginning of the Civil War: "It was purely chance whether any movement ordered from headquarters would be made at all; a rare chance whether it would be made at the time designated in orders; a miraculous chance if it were made exactly as ordered." The inertia to be overcome in this case would be very great.

A sharp contrast with this is afforded by the remarkable smoothness with which the Grand Fleet was operated. The system and methods in carrying out their sweeps in the North Sea were the gradual evolution of four years of war and had been reduced to a definite system. The entire Grand Fleet could get to sea well within four hours, in which time all the necessary protective measures would have been completed. It is well worth while to study with care the signals sent by the units of the Grand Fleet while they were leaving port for the cruise which culminated in the Battle of Jutland.

When the fleet is in motion the factors which produce inertia now could be considered to cause internal friction which tends to slow down the advance of the fleet. To these factors must be added the numerous casualties, particularly in the engineering department, which are so frequent in naval warfare. Note for instance the great amount of condenser trouble experienced by the battleships of the Grand Fleet during the first months of the war, when the steaming was more continuous than had been expected. Another form of internal friction is caused by the lack of co-op-

eration between subordinate commanders and by disloyalty to the commander-in-chief and the general plan. It is reported that these conditions existed in the German Army on the Western Front in 1914, and if such was the case, it is probable that they had much to do with the failure of the Germans.

In addition to the internal friction there is what might be called external friction. This is present in three forms. The first is the delay and damage caused by unfavorable weather conditions; during the war there were numerous examples of groundings, collisions, and of injury caused by heavy weather, and of delays caused by storms, fogs, and currents. The second form is caused by enemy action. It consists of damage caused by enemy mines and delays made necessary by making detours around waters known to be mined by the enemy; of delays caused by zigzagging and by enemy torpedo hits; and of other losses caused by enemy action and the various counter-measures taken when contacts with enemy forces are reported.

The third form of external friction may be summed up in the word logistics. This usually decreases the mobility of a fleet and often prevents its advance altogether, when it must operate from positions where fuel storage and drydocking facilities have not been established during peace. The repair facilities of the fleet are now so extensive that such facilities ashore in the theatre of operations are not so essential as they formerly were.

Thus far we have considered only strategical mobility. Tactical mobility is equally important. The High Seas Fleet at Jutland showed such mobility to a degree never before attained. This was due to the excellence of the Germans in communications, to their perfect indocrination in the method of fighting a fleet action, and to their long years of tactical training before the war. The following are some methods by which the effects of inertia and friction may be reduced and strategical and tactical mobility gained:

1. The development of war instructions and doctrine for all classes of ships. Very considerable progress has been made in the preparation of theoretical instructions, but they have not been sufficiently tested out in actual maneuvers.

2. The training of our officers in the application of these instructions, both on the game board and in maneuvers. An

excellent start in some forces has been made in this work, but, in general, by far the greater part of this work lies before us. We have a long road to travel before we can approach the High Seas Fleet in tactical mobility.

3. The instruction of staff officers in war staff work. Today we are fairly well versed in purely administrative staff work, but know practically nothing of war staff work. The difficulties of the immediate situations consume the time of staff officers and little thought is given to war plans and the methods of using the naval forces in war. In some places, however, a start is being made.

4. The continuation of our good work in communications; a specialty should be made of battle communications, and in particular those relating to destroyers, aircraft and submarines.

5. Whenever a naval force leaves port for a cruise, orders should be issued as if a state of war existed and all the necessary protective measures should be taken. Tactical and strategical exercises should invariably be carried out enroute.

XIV. THE APPLICATION OF THE OFFENSIVE SPIRIT IN WARFARE

Having now considered some of the measures which may be taken to develop the spirit of the offensive, and the means by which mobility may be developed so that we make use of this spirit, it remains to examine the ways and means by which this spirit of the offensive may be applied to actual warfare.

It will be convenient to consider this problem from the viewpoints of both strategy and tactics.

XV. FORMS OF OFFENSIVE STRATEGIC OPERATIONS

In strategy the spirit of the offensive may be applied in two ways:

1. In an offensive campaign carried on for the purpose of controlling vital lines of communication, taking advantage of every opportunity of forcing a fleet action on the enemy.

2. In a limited offensive campaign in which for some good reason, usually a decided inferiority in fighting strength, it is desirable to avoid a fleet action, but in which we carry on intensive and persistent operations with destroyers, submarines, light cruisers, mine-layers, and aircraft to wear down the enemy, and, if he is operating away from his home bases, to attack his com-

munications to such effect that he is compelled to retire from his position. The battle force should be used frequently in operations designed for bringing to action portions of the enemy battle force not greatly superior to ours.

There should be no passively defensive campaign under any conditions.

The first form of campaign might be called that of the "absolute offensive," while the second could be designated as the "limited offensive." The latter would correspond with the French idea of making limited attacks, among which were the two very successful Verdun operations in 1917. Our St. Mihiel offensive might also be put in this class, as distinct from the Meuse-Argonne, which was an absolute offensive.

XVI. THE ADVANTAGES OF OFFENSIVE OPERATIONS

All offensive operations have two great advantages, which are inherent in them and are present in all cases. They have greater effect in the absolute offensive than in the limited offensive.

The first is the advantage of surprise, which devolves from the fact that we hold the initiative. "We have," said Admiral Bacon, "the enormous advantage of knowing what we are going to do, where we are going to do it, and when." These advantages were never better illustrated than in the action in Heligoland Bight and the attack on Zeebrugge. The advantages cited by Admiral Bacon decided both enterprises in favor of the British.

The second is the great moral advantage which lies on the side of the fleet taking the offensive. This was never so marked as in the naval campaign of 1805, when the French were continually avoiding action and the British seeking it. The German strategical ideas as to the naval campaign in the North Sea had always been defensive, because they expected that the British would make an immediate attack on their coast with naval and expeditionary forces. At the beginning of the war the German Fleet was all keyed up for the great naval battle which would result from such an attack; as soon as it became apparent that the British had no intention of making such an attack, all prospect of a naval battle vanished, because the Germans had no idea of carrying the offensive into British waters. In consequence their enthusiasm waned. "To anyone who experienced it," writes Commander Groos in the official German history, "there can never be for-

gotten the picture of the outgoing battle cruisers and ships of the first squadron, the decks cleared for action, the officers on the bridge, the men on deck, while the rousing singing of patriotic songs and the cheers of the crews, mingled with those of the population on shore, filled the harbor. . . . Even the day of departure brought disillusion. The battleships anchored in the Jade, and for the time being, fleet, squadron, and cruiser staffs busied themselves primarily with the safeguarding of the German Bight and bases in the river mouths. Very soon military interest was almost exclusively directed to this important, to be sure, but still subordinate and purely defensive task."

For the above two reasons a force acting on the offensive has probably an advantage of twenty per cent over one acting on the limited offensive and forty per cent over one acting passively on the defensive.

XVII. OFFENSIVE OR LIMITED OFFENSIVE OPERATIONS

The first decision to be made in war is to determine whether we can act on the offensive or whether we are compelled to make use of the limited offensive. In this estimate we must give consideration to the inherent advantages which all offensive operations have, but it will be necessary to make an independent estimate in each situation, because sometimes these inherent advantages will be more than counter-balanced by other special factors.

Estimate the relative strength of the opposing forces, considering not only numbers of ships and men, but the quality of the ships and the efficiency of the personnel.

Next determine the relative advantages of the strategic positions occupied by the opposing forces.

Finally make an estimate as to how the relative strength and strategic positions are liable to change in the near future.

In making these comparisons, avoid the error of exaggerating the numbers and efficiency of the enemy, as McClellan did in the peninsula campaign, and as was done so frequently in the World War. Do not credit the enemy with being able to do things you would not consider doing yourself. Do not get the idea of imagining what the enemy can do to you, but consider all the things you can do to him. When after the Battle of Cunaxa, the Persians demanded that the Greeks give up their arms, Theopompus the Athenian replied: "Do not suppose that we shall

give up to you the only things of value we possess; but with these in our hands, we shall fight for whatever of value you possess." This doubtless impressed the Persians.

The following four principles may be used as a general guide as to whether the offensive or limited offensive should be used in strategic operations:

1. If to a decided inferiority in fighting strength and strategic position is added the fact that the situation is due to change to our advantage, then we are usually justified in using the limited offensive as a temporary expedient.

2. If we are practically equal or superior and the situation will improve still more, it must be remembered that an opportunity to engage the enemy in a fleet action happens only once in years and consequently the offensive should be taken and every advantage taken of opportunities to force a fleet action on the enemy.

3. If we are superior and the situation is due to change to the advantage of the enemy, then the offensive should be taken with the idea of bringing the enemy to action immediately and even under unfavorable conditions.

4. If we are inferior and will probably become still more inferior in the future, and there is no chance of winning the war with land forces or through other agencies, a desperate chance must be taken and the enemy engaged under the best conditions we can obtain.

(To be concluded)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE AUTOMATIC DEPTH RECORDER AS AN AID TO NAVIGATION

BY LIEUTENANT S. G. LAMB, U. S. NAVY

As practically all the Navy knows, investigation and experiments have been carried on since the war to develop apparatus with which to locate the positions of submerged sound aids (sound transmitters) to navigation by recording their bearings, for use in foggy or unsettled weather, and further to obtain accurate depth soundings of the sea bottom without recourse to the hand lead or deep sea lead.

An apparatus which determines depth soundings by utilizing the reflection of sound waves from the sea bottom has been developed and perfected by Dr. Harvey C. Hayes, Sound Aide and Physicist of the Naval Experiment Station, Annapolis, Md., and is now in use on board the U. S. S. *Stewart*. The principle on which the apparatus works is, briefly, as follows: The time interval between making a sound wave on board ship, such that the wave is transmitted to the water through the skin of the ship, and the reception of the reflected wave from the sea bottom, is accurately measured and the depth is calculated from this time interval, having previously determined the velocity of sound in sea water in feet per second.

In practice an oscillator is mounted in a tank in the stern of the ship and a hydrophone is installed in the bow. Oscillator signals are made by the operator and the time between making the direct signal and the return of the reflected signal—the echo—is accurately measured by means of the sounding receiver. This time interval, referred to a scale, gives the depth in fathoms.

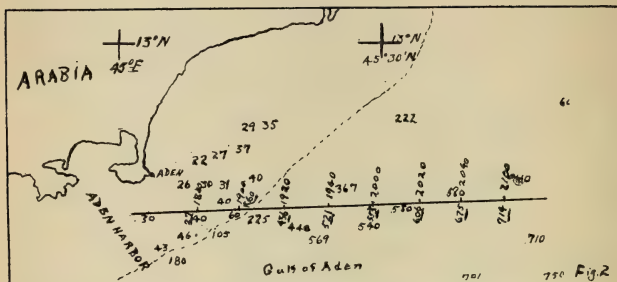
There follows a case in which soundings obtained as described above proved of great aid in locating and checking the position of the ship as previously observed by celestial navigation.

On August 1, 1922, while enroute to the Asiatic Station in company with Destroyer Squadron 15, making passage from Aden, Arabia, to Colombo, Ceylon, a course was set to pass Farun Rocks at 9:10 A. M. on the starboard beam, distance twenty-one miles. No change of course was made during the night of July 31–August 1, nor was it noted that the course steered was other than the one which had previously been set. Reference to the chart, tracing attached, Figure 1, showed that the least depth of water on this course should be not less than 295 fathoms up until the time of passing Farun Rocks abeam, and that practically all depths to be expected were in the neighborhood of 1,100 fathoms. As the southwest monsoon was blowing during this time (and from the current descriptions in the Sailing Directions) a set to the northward of from one to three miles per hour was expected.

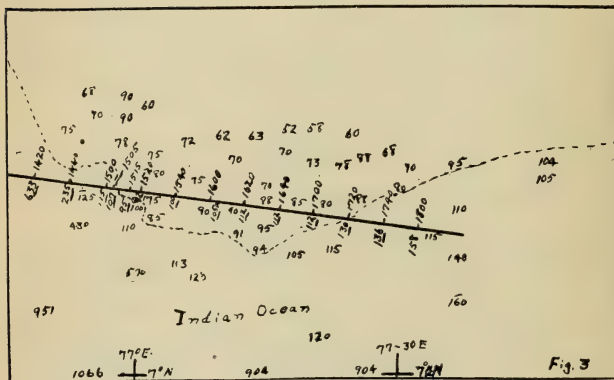
At 4:00 A. M., time zone description minus three, the listening operator on watch reported a sounding of 570 fathoms. Soundings were taken as shown in Figure 1, with depths as indicated. Upon comparison with the chart of this locality it was determined that the path of the ship was not that shown on the chart, line A B, but rather was that shown by line A' B', and that instead of the course previously set, 89° true, being made good, a course of 95° true had been made good during the night. This was later checked by accurate bearings and fixes obtained from navigational aids, and proved to be correct.

Another item of interest is that instead of a set to the northward being encountered, a set of three-eighths of a mile per hour to the southward was experienced.

Figure 2, shows the track of the *Stewart* leaving Aden. The soundings taken checked very closely with those on the chart, and with the navigational positions, and were obtained at the times expected, from previously laying off the distances on the chart. Figure 3, shows the track of the *Stewart* on crossing the hundred fathom curve south of British India, on the afternoon of August 5, 1922. Before reaching the hundred fathom curve it was estimated that the soundings should show close to one hundred fathoms at 15.07. At 15.00 a sounding of 115 fathoms was obtained; at 15.05 a sounding of 107 fathoms was obtained, and at 15.15 a sounding of 95 fathoms was obtained. Across the bank inside the hundred fathom curve the soundings by sound



TRACK OF U. S. S. "STEWART" AFTER LEAVING ADEN



TRACK OF U. S. S. "STEWART" ACROSS 100-FATHOM CURVE, SOUTH OF BRITISH INDIA

receiver do not check absolutely with those given on the chart, but it is thought that this may be due to inaccuracies in the former survey. The charted time for leaving the one hundred fathom curve was 17.20. At this time a sounding of 130 fathoms was obtained which showed an appreciable increase over previous soundings.

In Figures 2 and 3, the times are those of the twenty-four hour clock. The soundings in these two figures are underlined for the sake of clearness. In all three figures soundings obtained by sound receiver are set down opposite their respective times.

From a consideration of the soundings by chart and those by sound receiver it may readily be seen that the results obtained by this apparatus are accurate and are to be relied upon. This apparatus should prove of great value in the safe navigation of a ship, especially when cruising in waters where the bottom is well surveyed, as an accurate line of position may be obtained from soundings obtained by the sound receiver.

The United States Navy has the distinction of being the first to put this apparatus to practical use, as a line of soundings has been run to date from Newport, R. I., to Colombo, Ceylon, B. I., via the Atlantic Ocean, Mediterranean Sea, Red Sea, Gulf of Aden, Arabian Sea and Indian Ocean. This line of soundings will be continued to Manila, P. I., and when the *Stewart* returns to home waters will have been run around the earth.

DISCUSSION

Employment and Tactics of Aircraft in Naval Warfare

(SEE WHOLE No. 238, PAGE 2135)

Comment by Commander John P. Jackson, U. S. Navy, on Lieutenant R. G. Pennoyer's discussion on the "Employment and Tactics of Aircraft in Naval Warfare."—Regarding Lieutenant R. G. Pennoyer's discussion of my article in the August issue, "Employment and Tactics of Aircraft in Naval Warfare," I have some comments to make.

First, let me acknowledge with gratification the complimentary reference to the article in Lieutenant Pennoyer's opening paragraph. The article originated while I was in Brazil as a member of the U. S. Naval Commission to that country, through the request of the Brazilian Naval General Staff to give them something concrete in regard to the uses to which aircraft could be put in war and their proper tactics to accomplish their mission.

In my researches in preparation of this work for the Brazilian General Staff, I was struck by the fact that little if anything had been written upon the subject, although there was much heated discussion and bitter controversy over the capabilities of aircraft and violent arguments as to whether or not they had rendered battleships obsolete. I was, therefore, reduced to the necessity of an analysis of the problem myself, in the light of aerial accomplishments during the Great War and of experiments subsequent thereto.

My chief purpose in submitting this paper to the Naval Institute for publication was to open up a field, which for some unaccountable reason, had not received due consideration of the services at large from a dispassionate standpoint, and to start a much needed discussion upon the possibilities of this newest manner of conducting war.

In this I have in a measure succeeded, and it is hoped that others will come forward in defense of particular weapons and methods of using them, in which they may be interested or about which they have special knowledge. The subject is one which closely concerns all those to whom the defense of the Nation is intrusted, whether they be of the sea, land or air forces. Every officer of each of these services should be conversant with the capabilities of the others, and there exists at present great need for the education of service opinion in the land and sea forces in regard to aerial matters.

I had rather expected to hear from some champion of the torpedo plane, as I did not make out a very good case for this type of aerial weapon. I have seen no reason, however, to change my opinion, as a result of the recent torpedo plane attacks upon battleships off the Vir-

ginia Capes, in spite of the fact that under the conditions of non-resistance to the attack except by maneuvering, a good many hits were scored.

In Lieutenant Pennoyer's comment on paragraph 15 of my article, he is apparently uncertain as to my meaning in stating that the speed of dirigibles is moderate. The meaning intended to be conveyed is of course that their speed is moderate in comparison with that of airplanes. The passage occurs in the article under the heading "Types of Aircraft," and no reference is made in that section to surface craft. Of course, almost any layman would know that the speed of dirigibles is much superior to that of surface craft, and no allusion was made to the latter, or implied, in the use of the word "moderate."

Lieutenant Pennoyer's comment on paragraph 16 seems to bear out exactly what I have stated as to the failure of the Zeppelins at the Battle of Jutland. His data regarding the British mooring mast, perfected since that battle, is very interesting, but it is not apparent what bearing it has upon my statement, "Dirigibles can operate only from the shore, and therefore cannot be counted on for reliable use with the fleet."

In this case the dirigibles failed in spite of the close proximity of their bases. Their chances of success when operating at great distances from their bases are correspondingly less. Naval battles will not always occur as near bases or stations where masts can be erected as did Jutland. In fact the presumption is quite to the contrary, and that future naval battles may occur thousands of miles away from any locality where there are likely to be mooring masts.

As to the Battle of Jutland itself, it cannot be seen how the existence of this perfected mooring mast could have in any way affected the operations of the Zeppelins. Their failure was inherent in themselves, and not due to their mooring devices.

Referring to Lieutenant Pennoyer's suggestion that mooring masts might be erected upon special aircraft carriers, that of course, is a possibility of the future, but I know of no experiments to indicate whether it is feasible or not. At least no such attempts have to my knowledge as yet been made, and in treating of a problem of this kind, one can only deal with actualities, or at most with conditions which may be created by experiments already in progress. If we go beyond this we get into the realm of pure fancy. Let such a mobile mooring mast be successfully constructed, and I shall readily revise my statement as to how much the fleet can count upon the use of dirigibles. At present I see no reason to alter it in any degree.

In paragraph 41 commented on by Lieutenant Pennoyer, the radius of 1,200 miles referred to means, of course, the total flying radius, just as one speaks of the steaming radius of a ship, and I must take exception to his statement that the total distance this type can perform duty is only half of this, or 600 miles. I made no mention of a flight straight out and back, as he has assumed.

The discussion was regarding the *area* which could be covered by aircraft in comparison to surface vessels. An airplane can of course fly out along one radial from its starting point, then around the arc of a circle and back along another radial, thus utilizing practically its entire 1,200 miles of flying radius in effective scouting under conditions when it is desired to cover a certain specified area. No comparison was being made between planes and dirigibles, but between aircraft and ships. The greater radius of action of a dirigible is conceded, and a little further on in that paragraph I stated that "Dirigibles are especially adapted to this work on account of their very great radius of action."

I cannot agree with Lieutenant Pennoyer's statement that a dirigible should be able to see as quickly as she is seen, unless he refers to dirigibles in comparison with surface vessels; and even in this case, the advantage probably lies with small surface vessels. In comparison with small fighting planes, which the enemy will undoubtedly have out in his vicinity there can be no question as to which can see or be seen first. The fighting plane can probably approach, rise over, or cut off the retreat of the dirigible, without being seen until in position to attack.

As to Lieutenant Pennoyer's picture of the ease and comfort with which astronomical observations can be taken and worked out on board a dirigible, the recent exploit of Admiral Gago Coutinho and Captain Sacadura Cabral of the Portuguese Navy, in flying from Lisbon to Rio de Janeiro, has shown the accuracy with which airplanes can be navigated, and has gone far toward dispelling the fancied difficulties.

The flight was undertaken solely to prove the reliability of Admiral Coutinho's methods of navigating an airplane and the value of the instruments which he had adopted or invented. The flight was a complete vindication of both.

Lieutenant Pennoyer states that the navigator of a dirigible can make observations without depending upon the horizon or height of eye, with an average error of about ten miles and at worst of certainly not more than twenty miles. Admiral Coutinho did much better than that. In his flight he used the sea horizon exclusively; but for night flying he uses an artificial horizon in taking observations of the stars, and a sextant with an illuminating device by which the bubble is dimly lighted.

When using the sea horizon he obtained his height of eye by measuring the dip of the shadow of the plane by means of a graduated arc easily read to one-half a degree, a simple and accurate operation. From his experience in navigating airplanes, he states that he can trust observations taken from a flying plane with the sea horizon, to within *one minute of arc*. In other words they are reliable in exactly the same degree as observations made on board a surface ship. He did not use a special windshield, the machine itself creating an eddy, so that he was not annoyed by the wind. Nor did the vibration of the plane bother him in the least.

He completely demonstrated his assertions by his actual performance. On the leg from the Cape Verde Islands to St. Paul rocks, during a flight of 11 - 1/2 hours over the open ocean, he laid his course so accurately that

before sunset he picked up the rocks dead ahead. These rocks are only a few hundred feet in extent, for the greater part only twenty feet above water, with the highest point only sixty feet. In this leg Admiral Coutinho took forty observations and on the whole flight over 100 astronomical observations for positions, *all* with excellent results.

My article was written before the flight from Lisbon to Rio. In the light of this performance, my statements regarding the difficulties of navigating aircraft should be modified, and I believe that Lieutenant Pennoyer will feel the same way regarding his statement that the error in observations taken from dirigibles is ten to twenty miles.

In his comment on my paragraph 62, Lieutenant Pennoyer says that he has already stated the means by which these craft may be maintained with the fleet. True, but he forgets that this means is not in existence, and that no steps have yet been taken to prove its feasibility. When his mobile mooring mast becomes an accomplished fact, I will revise my opinion as to the degree of dependence the fleet can place upon the presence of dirigibles with it at the crucial moment.

While speed and radius of vision are doubtless the most important considerations in scouting, they are of little use if contained in a vehicle so vulnerable as to render prohibitive losses probable. And I still maintain that surface vessels are more dependable than any type of aircraft for protective scouting, especially against submarines, which can be detected more readily by submarine listening devices than by any other means.

Lieutenant Pennoyer closes by again claiming that the climbing ability and greater ceiling of dirigibles would protect them against attacking planes. Again I must invite his attention to the fact that small fighting planes may well attain a favorable position for attacking a dirigible before being seen by the latter, which would, therefore, have no opportunity to use these superior qualities.

Naval Corps, Specialization and Efficiency

(SEE WHOLE No. 235, PAGE 1491)

CAPTAIN ELLIOT SNOW (CC) U. S. NAVY.—Twice^{1 2} within a year it has become necessary to reply to articles that have appeared in the U. S. Naval Institute PROCEEDINGS affecting the Construction Corps. In one case this was because of unfair statements concerning that Corps and the other was due to the illogical attitude of the author on the subject of amalgamation and specialists.

The article³ contributed to the September number of the Naval

¹ Discussion of "Officers for Shore Duty Only," Page 263, Whole No. 228.

² Discussion of "Amalgamation and Specialists Versus Corps," Page 440, Whole No. 229.

³ "Naval Corps, Specialization and Efficiency," by Lieutenant Commander T. C. Kinkaid, U. S. Navy, Page 1491, Whole No. 235.

Institute PROCEEDINGS by Lieutenant Commander T. C. Kinkaid advocates selective specialist training for Line officers. It was noted with some satisfaction that his position as regards specialists is contrary to the one taken by Commander J. O. Fisher, U. S. N. However, he also advocates the amalgamation of those members of the Engineer Corps who perform shore duty only and the Construction Corps with the Operating Corps, the Line, with specialization in the combined Corps. The contradictory elements in the article are in themselves almost sufficient to refute the position taken. On one hand the author recommends specialization and on the other advocates doing away with several Corps of specialists. Comment on several points will help to clear up the question of amalgamation.

The sweeping statement concerning the lack of judgment of flag officers in selecting the staffs is a complete surprise, as is also the alleged inefficiency of the administration of the fleets because of the lack of experience and training of the staff. Judging from personal experience extending over a period of nearly forty years, the author's statements are not warranted and give evidence of hasty generalization, otherwise there would be cause for grave concern. Many in the service will doubtless await with interest comment on this point from those of experience in the seagoing branch.

Another statement unsupported by facts is found in the opening sentence of the fifth paragraph in which the author states—

“Corps specialization is decidedly unpopular, the feeling being general that special corps are both unnecessary and undesirable.”

There are members of the seagoing Corps who hold contrary views—officers of high rank and long experience whose mature judgment entitles them to be counted in reaching a general conclusion. And too, there are many members of other Corps in the Navy who do not subscribe to the author's statement. I ask therefore in all candor, “to whom is Corps specialization unpopular?” Is it unpopular to the younger and less experienced officers or the older and more experienced? If it really reflects a consensus of opinion, then it is but right and just that the Construction Corps be given the facts upon which this opinion is based. It is not necessary to repeat here the reasons why there should be Corps in the Navy. These are to be found in the discussion referred to in the footnotes of the preceding page. Actually there are many more applications from the younger officers of the line to enter the Construction Corps than there are vacancies. Does this have the appearance of unpopularity?

In one of those discussions the remark was made that there are many seagoing officers who consider the present conditions as regards engineering as distinctly susceptible of improvement. The confirmation of this view by the author is decidedly opportune. The question now naturally suggests itself, would the present engineering conditions as described by the author, *have been allowed to obtain*, had the Engineer Corps continued in existence instead of having been amalgamated as it was in 1899? And does it not emphasize the need for the re-establishment of that Corps?

What is needed in the service today is an expert seagoing Engineer Corps, a condition which should be recognized by the Line. There is excellent material from which to form such a Corps. The surest way for officers to become experts *under the administrative conditions that exist and which are likely to continue* is through Corps in which all are on an equal footing as to absolute rank.

Many articles that advocate the amalgamation of the Construction Corps refer to the design of ships and state in some form that the majority of the Construction Corps do not exercise this function. In this respect, the article "Naval Corps, Specialization and Efficiency" runs true but in a slightly different way. Concerning this the author states:

"The Naval Constructor and the Permanent Engineer are not the actual designers of material. They are the supervising designers and the run-of-the-line naval officer can be trained to do the work that the specialists do."

Any one so inclined could state with equal lack of force—with practically no force at all—that the Operating Corps does not actually operate the ships. There are signal boys to make signals; quartermasters to handle the helm; sight setters and gun pointers and crews to work the guns; enlisted men in the engineer's force to raise steam and handle the engines; coxswains to control the boats rowed by the crew and so on through the entire gamut of their profession. What the Operating Corps does is neither more nor less than what is done by the Construction Corps or any other of the Corps of the Navy. Through education and experience they direct and control the efforts of others; otherwise, why not simply train and never educate?

It is claimed that the Line officer has the advantage of practical experience afloat and is able thereby to consider recommendations and criticisms from a broader point of view. This is another favorite form of argument for the amalgamation of the Construction Corps with the Line. If I had time to review the technical files of but one bureau and present to the readers of the Institute even a part of the many conflicting recommendations that have been made by the seagoing officers on the identical problem of design, it would be clear at once that there is no force whatever in the form of argument brought forward by the author. The experience gained by a wide awake young officer on a submarine or destroyer has little value on the design of a turret or a stabilizer. If the design of our ships, or the principal systems and mechanisms of those ships, or even the lesser fittings, are to be confided to one Corps, all progress would at once stop. Insofar as the work of the Bureau of Construction and Repair is concerned and that of all other technical bureaus too, the state of the material of to-day represents the work of many minds. It is apparent that the author and others who hold similar views as to the design of our ships—the word design here used in its correct meaning to include details as well as general features—overlook the fact that ability to design requires long experience backed by accumulated data *correctly interpreted*. The many hundreds of minds include not only those of the Construction Corps but of the Operating Corps and all other Corps in the Navy without a single exception. Plainly,

the author possesses a meager knowledge of what his neighbor is doing.

The question is not whether the "run-of-the-line naval officers" can or cannot be trained in certain activities, but rather is it wise to superpose additional training on an already overburdened Corps?" According to the author's own statement some of the Line are already deficient in their own special field of endeavor and others too have failed to make a success of Marine Engineering.

To avoid a misunderstanding of what is here written, I now repeat that the individuals in any one of the Corps of the Navy could within the limits of their natural intellectual endowments become equally as efficient officers in any other Corps.¹

We need experts in the service and not dilettanti. Those who advance the view that the Construction Corps should be merged into the Line, because Constructors do not design ships, often fail to carry conviction with their words for the simple reason, it is evident *to the initiated*, they do not know the procedure connected with design. In this particular article the author states his views as to what constitutes the design function in the following words:

"The design of new material may be divided into two general functions; first, a clear-cut statement of what the mechanism is to accomplish, giving its general characteristics, followed by a critical inspection of the actual designs; and second, the actual calculations and arrangement of parts. The first of these functions can be best done by a Line officer specialist who is familiar with practical considerations, etc. The second can be accomplished only by a designing engineer of whom there are plenty available in the drafting rooms of various naval establishments and outside contractors."¹

The designs of our naval vessels in general are the result of team work; the design of the various systems and arrangements of spaces represent, not the work of one Corps only, but of many, in fact of *all* seagoing Corps, and of many able civilians. The designs of the fittings that are to be found in the various systems are not the creations of a moment, but of long development and continuous study. Where any of these elements of design affects the work under the cognizance of a bureau other than the one having initial cognizance, the former always has a chance to comment. But in the long run some one Corps must be responsible for combining all these complicated and conflicting requirements into a homogeneous whole.

Who will be responsible for the structural strength and stability of all ships if the Construction Corps is amalgamated with the line?

Would there then exist a legitimately critical attitude of the products of design?

If the present skilled personnel of the Construction Corps be withdrawn from Aeronautics what will be the result?

¹ "Amalgamation and Specialists Versus Corps," Page 440, Whole No. 229.

The answers to these few questions are obvious to one of long experience in the service.

The military characteristics of vessels are now decided by a body of Line officers, the General Board; major alterations that affect these military characteristics are likewise decided by the Line; this of course is as it should be. As to the requirements to be met by the various systems on our naval vessels and even of lesser elements of mechanisms, has not the Operating Corps a preponderating voice? The older and more experienced members of the Construction Corps in discussing technical reports, often make the passing observation: "Why is it that so many of the seagoing officers content themselves by simply reporting some defect without offering any suggestion and apparently without making any endeavor to locate and report the cause of the defect? Is it due to lack of observation, insufficient interest or inability to constructively criticize?"

The author closes his article by stating that it is not an indictment of the Construction Corps, nor the officers who have been designated for engineering duty only, but it is intended to be a constructive criticism of a system which has many evils. The disclaimer and good intent expressed by the author may readily be accepted as some of the suggestions are constructive, but the one which advocates amalgamation is open to most serious question. One of the great evils of the naval service today is not the existence of Corps, but it is the steadfast refusal of the Operating Corps to recognize and admit that the work of other Corps is necessary, is in the main well done and that all Corps are an integral part of the navy. Until the day dawns when this view is accepted, our house will be, in some degree, divided against itself with all attendant disadvantages.

Those who ride the hobby of amalgamation may at this point perhaps observe:

"So long as a man rides his hobby horse peacefully and quietly along the King's highway, and neither compels you nor me to get up behind him, pray sir, what have either you or I to do with it?"¹

But, to others the query then naturally suggests itself:

"But what shall we do, when he not only attempts to force us to get up *behind him* but makes us *pay* for the ride as well!"²

A closing word is added to the younger officers of the service who may have read the article on "Naval Corps, Specialists and Efficiency," and have received from it an incorrect idea as to the real merits of the point at issue. False prophets arise and deceive many but the Construction Corps and other Corps too will endure to the end if they will but continue to erect their edifice on the rock of real and substantial achievement and not shift their foundation to the quicksands of gilded and glittering

¹*Tristram Shandy*, Chapter VII.

²*Citizen's Current Inquiry*. (paraphrased)

promise. In the long run a Corps will be judged by its works and not by its words.

The real significance of the article is this: in order to release Operating Corps to its legitimate work, the Navy needs more, not fewer corps; an Ordnance Corps, an Engineer Corps, and an Aviation Corps.

The best and only safe policy to be followed by a Corps is, Our Country, *FIRST*, the Navy, *NEXT*, then the Corps, and *lastly* the individual.

LETTER TO THE EDITOR

Picatinny Arsenal, Dover, N. J.

November 13, 1922.

Dear Sir:

I wish to call your attention to an error which is present in my article published in October, 1922, issue of THE PROCEEDINGS.

Equation 5 on page 1775 reads:

$$V = \pi R^2 h - \frac{\pi h^3}{3} - 2\pi(R-r) \left(h\sqrt{R^2 - h^2} + R^2 \sin^{-1} \frac{h}{R} \right) + \pi(R-r)^2 h$$

The 2 in the third term should not be included and the correct equation is:

$$V = \pi R^2 h - \frac{\pi h^3}{3} - \pi(R-r) \left(h\sqrt{R^2 - h^2} + R^2 \sin^{-1} \frac{h}{R} \right) + \pi(R-r)^2 h$$

This 2 also occurs in the equation directly preceding equation 5 and should be omitted there also. This same 2 also occurs in the third term of the denominator of Eq. 6 and should not be there.

Yours truly,

H. M. BRAYTON,

Ordnance Research Engineer.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Membership Life, regular and associate, 4855; new members, 16; resignations, 1; deaths, 5.

Practically the whole service receives the benefit of the PROCEEDINGS, yet many officers who read it monthly are not members, and therefore contribute nothing to the support of the Institute.

The publication of the PROCEEDINGS involves a monthly deficit that is a tax on the resources of the Association. As this deficit can best be overcome by an increase in the membership roll, the loss of 355 members during the last year is a serious matter. However, the gradual decrease in membership during the last few years may be looked upon as an aftermath of the war. Earnest effort is being made to counteract this, and there are encouraging signs that soon the tide will turn the other way. If the Service will give the Institute a little more support, it will not be necessary either to curtail the PROCEEDINGS or to increase the yearly dues. *Members are requested to urge non-members to join, and to send subscriptions for the PROCEEDINGS to their friends outside the Service. These may begin with any month desired.*

Dues The annual dues (\$3.00) for the year 1923 are now due. *Regular and associate members* of the U. S. Naval Institute are subject to the payment of the annual dues *until the date of the receipt of resignation.* Subscriptions by or for *non-members* are \$3.50 per year; these are *automatically discontinued at expiration.* (Foreign postage 50 cents extra in all cases.)

Discussions Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at one-half the rate for original articles, or about \$2.25 a page.

Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Attention is invited to the fact that the submission of articles is not limited to members, and that authors receive due compensation for articles accepted for publication.

The attention of contributors is requested to the difficulties attending the publication of long articles in the PROCEEDINGS. The number of pages in each issue is limited. Also, members have criticized the unbalanced effect resulting from the publication of long, discursive papers. It follows that compact, well digested articles are more likely to be accepted for early publication.

Book Reviews As soon as practicable after the publication of books on subjects of professional interest, the Institute aims to publish authoritative reviews of them.

The Board of Control has authorized increased compensation for book reviews in order to improve these columns in the PROCEEDINGS.

Book Department *The Institute Book Department will supply any obtainable naval, professional, or scientific book at retail price, postage prepaid.* The trouble saved the purchaser through having one source of supply for all books should be considered. The cost will not be greater and sometimes less than when obtained direct from dealers.

Attention is invited to the following books that are additional to those listed in our advertisement columns:

The Boat Book, 1920—price: 50 cents.

Landing Force and Small Arms Instructions, price: \$1.00.

Principles Underlying Radio Communication, 2nd edition (comprising radio communication pamphlet No. 40, prepared by Bureau of Standards; revised to May 24, 1921 by Signal Corps, U. S. A.) price: \$1.00.

Address orders to: U. S. Naval Institute, Annapolis, Maryland.

Address of Members To insure the delivery of the PROCEEDINGS and other communications from the U. S. Naval Institute, it is essential that members and subscribers *notify the Secretary and Treasurer of every change of address without delay.*

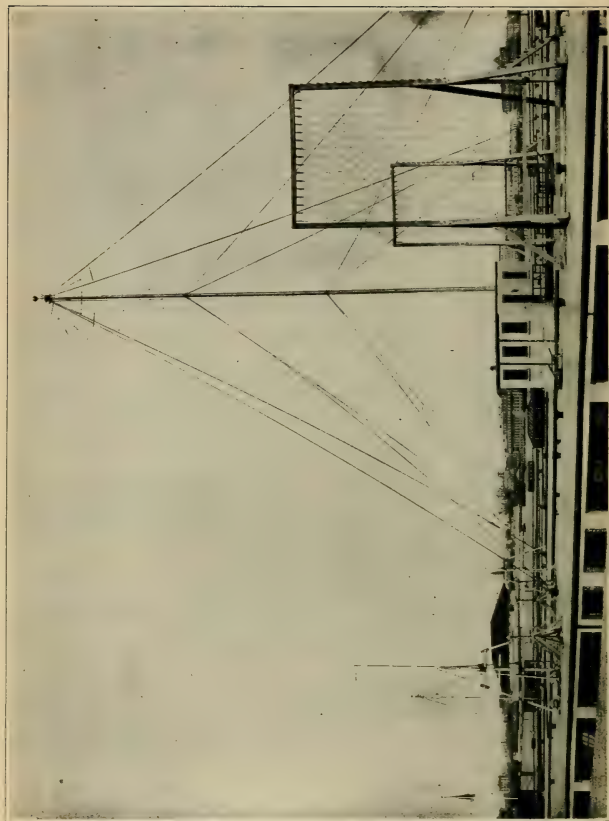
Reprints of Articles The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished can be greatly reduced if the reprints are struck off while the article is in press. Twenty copies of reprints are furnished authors free of charge. When the article is submitted, authors are requested to notify the Secretary and Treasurer of the number of additional reprints desired.

Changes in Board of Control The resignations of Captain J. A. Furer, (CC) U. S. Navy, as member of the Board of Control, and of Commander C. C. Gill, U. S. Navy, as Secretary and Treasurer, due to assignment to duty with the Naval Mission to Brazil, were accepted with regret.

Captain R. M. Watt, (CC) U. S. Navy, was elected as member of the Board of Control, and Commander H. G. S. Wallace, U. S. Navy, as Secretary and Treasurer.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

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ANTENNA AND LOOP COLLECTORS INSTALLED ON ROOF OF NAVY BUILDING IN WASHINGTON TO
SERVE THE RADIO RECEIVING STATION ESTABLISHED WITHIN THE NAVY DEPARTMENT

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER F. W. ROCKWELL, U. S. NAVY

and

LIEUTENANT J. B. HEFFERNAN, U. S. NAVY

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GREAT BRITAIN

TWO 35,000-TON BATTLESHIPS.—London, October 30.—The keels of two monster British battleships will be laid early next year, one at a shipyard on the Clyde and the other on the Tyne. Although the Washington naval armament agreement limits the size to a maximum displacement of 35,000 tons, the new ships will be the most formidable warcraft afloat.

They will be about 680 feet long and 106 feet in breadth. This enormous beam is made necessary by the elaborate means of defense against underwater explosions from torpedoes, mines and air bombs. In these two ships the anti-torpedo bulge will be fitted inside instead of outside the hulls.

Each will carry nine 16-inch guns in triple turrets as their main batteries. The total weight of a broadside salvo from these 16-inch guns will be nearly 20,000 pounds. These dreadnaughts also will mount large batteries of anti-aircraft guns. Their speed will be about equal of that of the fastest American or Japanese battleship. Each will cost about \$40,000,000.

The construction of these ships has been decided upon definitely, notwithstanding reports to the contrary. The British naval building program has not been affected by the recent political changes, even the Labor party being anxious to have them built.

One of the ships probably will be named the *Lion*, after Admiral Beatty's famous flagship, which is destined for the scrap heap. Both of these vessels are scheduled for completion in the fall of 1925, whereupon four battleships of the *King George V* class will be scrapped.—H. C. Bywater in *Baltimore Sun*, 31 October, 1922.

Washington, October 30.—Construction of two 35,000-ton battleships of the size, speed and armament outlined in H. C. Bywater's dispatch will give the British a very decided "edge" over the American Navy for years to come, according to ranking naval experts here.

Today's reports were the first definite information here on the size and type of battleships the British would build in conformity with the terms of the Arms Conference treaty, which allowed them to build two new battleships, and they aroused keenest interest.

Comparative figures show that on completion of three ships in 1925, England will have the largest warships afloat, and theoretically at least, the most powerful. Except for the battle cruiser *Hood*, pride of the Royal Navy, with her 41,200 tons, the two new fighting craft will be in a class of themselves.

Next to them in size come the leaders of the Japanese fleet, the *Negato* and *Mutsu*, having a tonnage of 33,800 tons each. Next are the two new super-dreadnaughts of the United States Navy soon to be completed, the *Colorado* and *West Virginia*, of 32,600 tons each.

These two are the vessels the United States was permitted under the treaty to complete, to preserve the 5-5-3 ratio when Japan insisted on retaining the *Mutsu*, which under the original Hughes proposal was doomed to be scrapped.

50 FEET LONGER THAN THE "WEST VIRGINIA"

The proposed British sea monsters are only slightly shorter than six battleships of the *Indiana* type, which, under the terms of the treaty, the United States must scrap; they are approximately 50 feet longer than the *Colorado* and *West Virginia*, more than eight feet greater in width and carry nine 16-inch guns instead of the eight on American ships.

Comparison of the total broadside salvos shows that the Britishers each will have 20,000, as opposed to the 16,800 pounds of each American ship. In this connection it is pointed out that when the two British ships are completed the United States Navy will have three warships carrying heavier than 14-inch guns, while the British will have 15 carrying 15 and 16-inch guns.

ALSO HAS TWO LIGHT CRUISERS

In addition to this Great Britain has two light cruisers that carry four 15-inch guns. These were not mentioned in the naval treaty. The United States has no cruisers of this type and cannot build them under the treaty.

It is considered highly probable that the speed of the two new battleships will be considerably in excess of both ours and the Japanese. On her trial runs the *Maryland*, sister ship to the *Colorado* and *West Virginia* made a little less than 22 knots, while the *Mutsu* ranges a little better than 23 knots.

To bear out their contention that the construction of these two super-dreadnaughts will make the British Navy stronger than ours, one ranking naval officer pointed out that when both nations complete their new capital ships Great Britain will have the advantage in tonnage that amounts practically to one capital ship. Great Britain will have 20 ships in her first line to our 18, with a tonnage of 558,950 to our 525,850. He estimates that the exact ratio of 5 to 5, on which the treaty is based, will not come into effect until the replacement program of our older ships, which starts in 1930, has run its full course.

CHEAPER THAN IN U. S.

It was pointed out that the cost of \$40,000,000 each will give British constructors much more leeway than such a figure here would, as labor and material are both cheaper there.

For a short time after the *Colorado* and the *West Virginia* join the fleet, so far as capital ships are concerned, the American Navy will have a shade on Great Britain. However, completion of the two ships will

tilt the scales, leaving the American Navy trailing even in that phase in which she is supreme in capital ships.—*Baltimore Sun*, 31 October, 1922.

THE NEW BATTLESHIPS.—The fact that the Admiralty, as we were able to announce last week, has invited tenders for the construction of the hulls and machinery of the two battleships which this country is empowered to build under the terms of the Naval Limitation Treaty, should finally dispose of the rumors which have been persistently circulating for many months, to the effect that the vessels in question were not to be proceeded with, their construction having been deemed inadvisable both for economical and technical reasons. Despite what has been said to the contrary, the Admiralty, we are given to understand, has never had the least intention of abandoning these ships, which it holds to be essential to the maintenance of that one-Power standard upon which its policy is based, a standard that involves keeping the navy at sufficient strength to ensure the safety of the British Empire and its sea communications as against any one other naval power. Nor will anyone who surveys the naval situation as it exists today deny the necessity of building the two new capital ships if the Admiralty is right in continuing to regard vessels of this type as the supreme embodiment of offensive power at sea. On that controversial question we have more than once expressed our views, and need only add here that the balance of evidence, theoretical as well as practical, is such as to vindicate the continued primacy of the great ship, for some years at all events; and it is the business of our naval authorities to legislate for the requirements of the discernible future, not for what may be needed at some period beyond the range of human prevision. We think, therefore, that the nation at large, notwithstanding its fervent desire for retrenchment, will approve the official decision with respect to the new battleships, for it is by no means prepared to sacrifice that measure of sea power which the Admiralty declares to be the minimum compatible with security for the country and the Empire. There could be no greater error than to assume that the British people have become indifferent to their navy or to the interests which the navy safeguards.

Owing to the many firms which have been invited to tender, bidding for the hull and machinery contracts promises to be unusually keen. The shipbuilding and affiliated industries are still suffering from an unprecedented shortage of work, and because of this circumstance the award of the contracts is awaited with intense interest in the districts affected. For the same reason, the Labor element has for once abandoned its traditional antagonism to armaments and is using its influence to procure the laying-down of the ships at the earliest possible date. The stake which the wage-earning community has in the work is, indeed, no inconsiderable one. Speaking in the Upper House on July 11, Lord Lee, the late First Lord of the Admiralty, said that the two ships at current prices would cost £6,500,000 apiece, or, including all accessories, reserves, stores, etc., both afloat and ashore, something like £8,000,000 apiece. Of this total of £16,000,000, at least £10,000,000 will be paid out in wages over a period of about two and a half years, so that the allocation of even one ship will be an immense boon to the wage-earners of the district that is fortunate enough to secure it. The Royal Dockyards are definitely out of the running as far as these two ships are concerned. Neither Portsmouth nor Devonport could undertake the building of a vessel of 35,000 tons with its present facilities, and to enlarge the slips sufficiently for that purpose would entail an expenditure which the Admiralty regards as inadmissible at the present juncture. It would, moreover, involve a delay of nearly two years, whereas the reinforcement of our navy by modern capital ships

is already overdue, and cannot be longer deferred. These were the main considerations which led the Admiralty to put all the four battle cruisers out to tender last year, and they apply with equal force now that the original program has been reduced by the Limitation Treaty to two ships of smaller dimensions. The largest men-of-war hitherto built at the Royal yards were those of the *Queen Elizabeth* class, displacing 27,500 tons, and having a length of 644ft. over-all. The new battleships are to be of 35,000 tons, and their length will not be far short of 700ft. Their beam, according to our information, will be 106ft., which will make them the broadest warships so far designed by any country, though it is only 9½in. more than that of the *Hood*. This remarkable increase of breadth, as compared with ships of the pre-war era is, of course, due in the main to the development of structural protection against underwater explosion, and especially to that ingenious and highly effective device known as the bulge. When the plans of the *Hood* were being prepared, it was realized that her completion would raise the question of dock accommodation in an acute form, as the ship would be unable to dock in any naval yard in this country, with the exception of Rosyth. The four "modified" *Hoods* of last year's program, since cancelled, were to have been considerably larger—47,000 tons was the displacement, as mentioned at the Washington Conference—though the Admiralty stated that the dimensions had been kept within limits which would obviate the necessity of any larger docks being provided other than those already existing. Still, had we been compelled to go on building vessels of that great size, the provision of additional docks capable of accommodating them would soon have become imperative, and we have therefore to thank the Limitation Treaty for sparing us heavy expenditure, quite apart from that involved in unrestricted battleship competition. As things are, our present docking resources will doubtless prove adequate for a long time to come.

Although their armament has not yet been disclosed, there is every reason for believing that the new ships will mount guns of the same caliber as those with which the "modified" *Hoods* were to have been armed: viz., 16in. It is also possible that, in spite of the greatly reduced displacement, they will carry the same number of these weapons. The much lower speed which has obviously been accepted for vessels re-designed as battleships proper instead of battle cruisers will mean a great saving in machinery weights, and the margin thus obtained is most likely to be employed in keeping the offensive and defensive attributes as far as possible up to the original standard. As, however, only two ships are to be built in place of four, there will be a corresponding reduction in the value of the armament contracts issued in connection with the building program. It should be noted, also, that the guns and mountings for the cancelled battle cruisers, part of which were ordered twelve months ago, will be used for the new battleships. The Vote for "Armaments" in last year's Navy Estimates stood at £6,726,000, and it was then proposed to ask for £6,683,000 under the same Vote in the Estimates for the current financial year. For naval guns, the cost of manufacture alone was estimated at £1,148,550, of which sum £810,000 was for the guns of the "modified" *Hoods*, and projectiles for those guns were to be manufactured at a cost of £800,000. All such items of expenditure have, of course, been reduced in consequence of the deletion of two ships. It is as well to emphasize these facts, lest the beneficial influence of the impending warship contracts on the industrial situation should be exaggerated. That they will, in any case, be most welcome, goes without saying, but it will take a good deal more than the ordering of two 35,000-ton battleships to reanimate the shipbuilding and engineering industries of this country, which have suffered so cruelly under the abnormal economic conditions of the post-

war period. From their point of view, the Washington Treaty has not been an unmixed blessing, for it not only reduced the amount of naval tonnage immediately in contemplation from about 190,000 tons to a mere 70,000 tons, but destroyed all prospect of further heavy contracts of this kind for a term of many years. On the other hand, prominent representatives of the industries named have been foremost in admitting that naval armament limitation will ultimately exert a healthful influence on the economic life of the nation, however unpromising its immediate effects may seem.—*The Engineer*, 3 November, 1922.

SPEED VERSUS BATTLE POWER.—That very high speed involves an enormous sacrifice of other qualities has always been appreciated by students of naval construction, but the fact has been brought out with special emphasis by ships built within recent years. In the *Renown*, for instance, we have a battle cruiser of 26,500 tons normal displacement—32,000 tons at full load—which can steam at nearly 32 knots, but she mounts no more than six heavy guns, and her armor is so thin as to be easily penetrable at extreme fighting range. Judging from the fate which overtook our three battle cruisers at Jutland, all of which were plated quite as heavily as the *Renown*, the latter would have incurred grave risk of destruction had she ever gone into action against the enemy's capital ships. The *Hood*, a ship of approximately the same speed, has much better protection, and mounts eight heavy guns, but it is obvious from a comparison between her and battleships of contemporary design that a very large percentage of her huge displacement is accounted for by the propelling machinery. Her offensive power is represented by eight 15in. 45-cal. guns, and her vitals are protected by 12in. armor. The battleship nearest to her in point of size was the *Massachusetts* (since cancelled), which was of 43,200 tons, as against 41,200 tons for the *Hood*. The American ship, with a speed of 23 knots, would have been nearly 9 knots slower, but in all other respects she was vastly more powerful. She carried twelve 16-inch 50-cal. guns, had 16-inch armor over vital parts, and was so well protected below the waterline as to be all but unsinkable by torpedoes or mines.

According to statements made at the Washington Conference, our four "improved" *Hoods*, were to have been about 4,000 tons heavier than the *Massachusetts*, but, even so, it is said, they would have been armed with only nine 16-inch guns. It would seem, therefore, that British naval officers still consider high speed of sufficient importance to justify a big sacrifice of hitting and resisting power, though the contrary inference had been drawn from a speech made by Admiral Chatfield some two years ago. As, however, our two new vessels are to be battleships and not battle cruisers, they will probably show a notable improvement in gun-power and protection at the expense of velocity.—*Naval and Military Record*, 1 November, 1922.

WARSHIP SCRAPPING AT HOME AND ABROAD.—In this country it has been taken for granted that the scrapping of naval material was already in full swing in the United States and Japan, pursuant to the letter of the Washington agreement, but according to recent information this is not so. Some weeks ago the Tokyo Navy Department issued a statement to the effect that, while plans had been made for disposing of warship tonnage condemned by the agreement, Japan did not feel warranted in scrapping a single ship until the treaty had been ratified by all the Powers concerned. For this reason she was awaiting the decision of France, who has not yet made clear her attitude toward the treaty. Another Tokyo message stated that a strong party in Japan would be in favor of making the Five-

Power Treaty a Three-Power Treaty should France and Italy fail to ratify the original instrument, adding that Japan was eager for financial reasons to carry out the terms of the treaty. Washington despatches on this subject indicate that, although the American Government is anxious to see the treaty put into force at the earliest possible moment, it has so far made no plans for an exchange of ratifications until all five signatory Powers are ready to record their formal approval of the compact. It would, indeed, be contrary to diplomatic usage to give effect to the treaty until ratification was complete.

One Washington correspondent affirms that should Japan officially suggest an easier exchange of ratifications by the three Powers who are principals in the 5-5-3 arrangement, the proposal would be carefully considered by the State and Navy Departments. It is recalled that the American, British, and Japanese delegations agreed that the 5-5-3 ratio should stand as regards the three Powers, whatever action might be taken by France and Italy. On the other hand, American naval officials are said to be strongly averse to carrying out the provisions of the treaty unless and until it has been ratified all round. The one fact that seems to emerge from all these reports is that up to the present neither America nor Japan has begun to scrap any of their really important ships affected by the treaty, whereas Great Britain has already started to demolish a number of vessels that would certainly have been retained in the navy but for the limitation arrangement with the two Powers named. There is, of course, no suggestion of bad faith on the part of any Power, and if blame attaches to anyone it is to Great Britain herself, who seems to have been over-hasty in sending valuable ships to the scrap heap before there was any obligation to do so.—*Naval and Military Record*, 1 November, 1922.

BRITISH TO STICK TO BATTLESHIPS.—It is significant of British opinion regarding the relative naval merits of battleships and airplanes that the next two great ships to be laid down in England are not plane carriers, but battleships. Their view evidently coincides with the great body of naval officers in this country, that the rôle of aircraft in naval warfare will be as an integral part of the fleet, and not as a substitute for that fleet. However erroneous this may prove in the remote future, there is no question that under present realities the attempt to use air power as a substitute for naval power would involve extremely dangerous chances that no person in a highly responsible position would be justified in accepting.

The British decision contains no element of snap judgment. To their extensive war experiences in bombing have been added many valuable experiments. Moreover, the press controversy instigated by Admiral Percy Scott and other prominent naval officers has led to widespread discussion and thought upon the relation between air force and sea force. The resulting official opinion probably comes as near to the correct one, in the light of present conditions and development in the near future on the water and in the air, as it is possible to reach.

The substance of such British opinion, as nearly as it can be estimated from the evidence of their decisions and their public discussions, may be summarized as follows: That air power and sea power are co-ordinate, and aircraft must take their place with battleships, cruisers, destroyers, submarines, mine layers, etc., as elements of a homogeneous force; and that the protection, aerial and constructional, that can be given to battleships against bomber and torpedoplane is deemed sufficient to warrant the perpetuation of the battleship type, so indispensable from a purely naval point of view.

This is substantially the same view held by the great majority of the best professional judges in the United States. But merely because the battleship is to remain is no reason for 'slacking up' in the development of aircraft, nor in equipping the fleet with them. These air measures should go forward as energetically here as they are sure to do in Great Britain, for undoubtedly the aerial rôle is of tremendous and increasing importance in relation to sea power.—*Army and Navy Journal*, 11 November, 1922.

SELECTING NAVAL INSTRUCTORS.—The attention of Flag and Commanding Officers is drawn by the Admiralty to the importance of the names of suitable petty officers being brought forward for duty as instructors in training establishments. The influence of instructors both in the training service and those establishments which deal with new entries must necessarily have a marked effect on the future of the Service, and therefore it is most necessary that petty officers who will make good instructors should be earmarked. Accordingly, in order that the names of suitable ratings may be noted at the depots, their conduct sheets in future should include a notation in red ink as to whether they are recommended or not for training duties. Stoker petty officers who are likely to make good instructors should be included in this arrangement.—*Army, Navy and Air Force Gazette*, 21 October, 1922.

OUR FUTURE FOREIGN POLICY.—Following the break-up of the Coalition and the consequent return to party Government, important modifications in Britain's foreign policy are anticipated. In France, it is said, the resignation of Mr. Lloyd George has been hailed with glee, while in Germany the same event is reported to have caused profound depression. The Paris papers take it for granted that our new Government will adopt a more vigorous attitude toward Germany on the reparations question, and will also press for the conclusion of a military alliance with France. It would, however, be more prudent to await the verdict of the country before jumping to conclusions. If there are many people here who would like to see sterner measures taken with Germany, there are others who think the time has come to put an end to that intolerable state of semi-war in which Europe has lived for the past four years, by pursuing a policy of conciliation toward our late enemies.

It were useless to pretend that British sentiment toward France has undergone no change since the war, or that a proposal to enter into formal alliance with her would evoke the same enthusiasm today as it might have done even a year ago. In the interval this country has been subjected to a perfect storm of vituperation by the French Press. We have been accused of treachery, deceit, and timidity in our dealings with Germany, and we have been threatened, more or less openly, with a great submarine program avowedly designed to undermine our naval supremacy. All this may have been the irresponsible vaporing of excited journalists, but in the recent Near East crisis we had unmistakable proof of French disinclination to help us out of an awkward corner. Before they assume any definite military obligations, therefore, the British people would like to have some pledge that the future policy of France will be rather less erratic and less provocative than it has been of late. They are ready to guarantee her against German aggression to the full extent of their resources, but only on condition that her treatment of Germany is not such as to make a fresh war practically inevitable.

In his vigorous speech at Leeds on Wednesday Earl Beatty denounced as fallacious the idea that developments in aerial warfare will lessen the Empire's need of naval defense. The British Empire, he reminded his audience, consists of something more than the British Isles. "The strength

of this wide-spread Empire lies in its physical as well as its moral unity, and its physical unity is, and must always be, maintained by the sea." The soundness of this proposition is scarcely open to dispute. But when the First Sea Lord proceeded to deny that aerial developments have robbed, or will rob, us of any of the advantages of our insular position, he was on less solid ground. So far as home defense is concerned we have certainly lost one great advantage that we formerly enjoyed by reason of our position as an island: viz., security against armed invasion so long as our fleet commanded the sea. Now that aircraft have attained such formidable powers, our great inland cities and centers of industry lie open to a devastating form of attack against which the sea affords no protection whatever. To that not unimportant extent, therefore, the development of aerial warfare has unquestionably modified the strategical situation.

As *The Times* observed last year, when this question was under discussion: "The one function of the Navy is the defense of the population and the commerce of this country and the Empire against attack; and any tendency to assume that the sea, so long as it is kept inviolate from surface domination, is still a complete barrier against hostile invasion, would be deplorable. The country looks to the Board of Admiralty to take the broadest view of its problems." The *Naval and Military Record* has been rebuked in some quarters for emphasizing the Navy's inability to protect the home country from hostile invasion by means of the air, but in our judgment it is vitally important that this fact should be realized by the community. Until it is realized we shall never get a well-balanced system of defense that will give us reasonable security against all forms of attack.

But when we turn from home defense to the strategical requirements of the Empire as a whole, few will question Earl Beatty's claim that sea power still remains the prime factor. For the time being, at all events, aircraft are essentially short-range weapons in comparison with ships, and however great an Air Force we might build up, it could not of itself do much to safeguard our Imperial communications. That will remain the task of the Navy for as long a period as human foresight can embrace. Within the limits of the Narrow Seas air power is probably destined to play a most important part in future naval warfare. Beyond those limits, however, it becomes merely an auxiliary to sea power, and enormous progress will have to be made before aircraft of any type can replace the larger ships of the Navy. The notion that airships, for instance, are already capable of superseding cruisers for the patrol of the ocean routes, either in war or peace, is utterly fantastic. Should the Admiralty decide to construct or to subsidize a certain number of airships, it will be because they regard these vessels as possessing some value for scouting and escort duty, not because they think them capable of taking the place of battleships or cruisers.

It is a fact not without significance that, whereas in this country there are naval critics who would be willing to scrap the fleet and stake everything on air power, every Dominion writer who discusses the problem of defense takes it for granted that surface ships, and especially battle cruisers and light cruisers, are the chief necessity of the future. The truth is that we at home have not yet discarded the North Sea habit of mind, and are too prone to examine every naval problem from the pre-war point of view. The best antidote to this is to study large maps. If this were done more generally there would be less of the absurd talk about defending Australasia and guarding the ocean highways, thousands of miles in length, by air power alone. We must still "send out our big warships to watch our big waters" if we wish to enjoy reasonable security against

the risks of the future. To scrap the Navy would be to scrap the Empire.—*Naval and Military Record*, 25 October, 1922.

¹ GIBRALTAR AVIATION BASE.—That Great Britain plans to make Gibraltar the most formidable air base in the whole world is alleged by the Spanish aviation magazine *Avear*.

"The British," says the journal, "have of recent years laid much stress on the fact that owing to changed conditions of modern warfare, both on land and sea. Gibraltar to a great extent has lost its former strategic importance. But the historic rock now enters a new phase. British engineers are busy planning the transformation of Gibraltar into a huge subterranean air station. The hillside will be tunneled in all directions, with vast cellars in which great fleets of airplanes and seaplanes will be in absolute safety from enemy attack. Huge oil tanks, repair shops, bomb and aerial torpedo stores will be complete in the mighty arsenal.

"In the center of the rock a large hall will house the planes, with galleries running in all directions of the compass to outside landing stations. There will be several tiers connected with each other by powerful elevators. This plan will enable the British to concentrate the largest air fleet ever seen in the world in a place of absolute safety, ready at any moment to sally forth to support naval squadron or undertake offensives over a very wide radius of action.

"Gibraltar will thus regain its former importance as a strategic base, and again become the crouching lion against whom nobody will dare attempt to dispute British sovereignty over the columns of Hercules."—*Aerial Age*, November, 1922.

COAST GUARD SERVICE.—As was foretold in these notes a short time ago, the proposed reorganization of the British Coast Guard Service, which since 1856 has been under the Admiralty and has been regarded as the Navy's first line of reserve, has proved to be full of pitfalls, and there has been a very general protest against the proposed reorganization, or rather abolition and rebirth as three separate services. One can realize the attitude of the various departments represented on the committee; indeed, it is only a matter of 1856 over again, but the complaint is that it should have been regarded from a national point of view and not from such narrow angles at all. It is rather curious to notice how changing conditions have reversed matters with the coast guard force. In the fifties, it was proved that the Navy was the only department which really benefited, yet the Customs and Excise Department had to pay for the force. This was seen to be unfair and, accordingly, the charge was transferred to the shoulders of the Admiralty. Now the Navy is the only service which hardly benefits at all, and they are naturally jibbing a little at having to bear the whole cost.

Meanwhile, the committee has convinced itself and a few other people that the proposed change would mean the saving of something over a million dollars a year. Unfortunately, there are still other people who stoutly maintain that three government administrations cost more than one and that, although there may be a great saving in the first year, or perhaps the first and second, the third is likely to see the beginning of interdepartmental jealousies and the foundation of three stations side by side where the work is now done by a single coast guard post.

Still another point is brought forward by the shipping and commercial communities, who point out that on more than one occasion lately there has been deplorable loss of life owing to the undermanning of the various coast guard stations on the coast. In England, the coast guards man the rocket apparatus, but not the lifeboats, and an incomplete crew is as unde-

sirable with the one as it is with the other. This is a matter of interest to everybody who is connected with the sea in any way, and it is to be hoped that some arrangement will be arrived at whereby the Admiralty retains control and is responsible for appointments and discipline, but that the other departments concerned have a say in the administration of the force and bear their share of the cost. For one thing, the coast guard is not by any means a bad billet for an old lower deck man, and the abolition of the force would make a difference when a youngster is considering the question of entering the Navy for long service.—*Our Navy*.

FRANCE

FRANCE AND NAVAL DISARMAMENT.—Reference is made in another column to the possibility of the naval disarmament scheme coming to grief through French opposition. We sincerely hope that French publicists are misrepresenting the real attitude of their governments towards the Limitation Treaty, for the rejection of that instrument would be nothing less than an international calamity. The mere prospect of a general reversion to unlimited battleship competition is enough to evoke a universal cry of protest, and we find it hard to believe that thoughtful Frenchmen seriously meditate a step which in all probability would have that result. It seems rather late in the day to protest against a treaty which was signed nine months ago by the accredited delegates of France, after a prolonged discussion in which every clause was carefully examined and debated. The deplorable loss of the battleship *France* is now being cited as a reason for "reviewing the entire question of tonnage ratios"; but, in fact, such misfortunes are already provided for in the Treaty, and France is free to lay the keel of a substitute battleship at once if she so desires.

There is something manifestly artificial in this sudden agitation against the Washington agreement, and the true motive of the movement appears to be related more to politics than defense considerations. If the tonnage ratios specified in the Treaty applied to all types of naval craft, France might have legitimate cause for complaint. But that is not the case. The only vessels affected are the battleship and the aircraft carrier, and as regards the first it has notoriously fallen into disrepute in France. No restriction whatever is placed upon the multiplication of cruisers, submarines, or aircraft, these being the very weapons to which French opinion attaches primary importance. From no practical point of view, therefore, can the Treaty be regarded as disadvantageous to our friends across the Channel. It deprives them of nothing they formerly possessed, nor does it fetter in any way the development of their sea armaments along the lines which their own experts have laid down. France may argue that the Treaty, by stereotyping her present comparatively feeble standard of strength, would prejudice any future claim she might lay to a higher naval rank than is now assigned to her, but this is true only so far as strength in capital tonnage is concerned. There is nothing in the document that would invalidate her claim to a larger ratio of sea power in the event of a new disarmament conference taking place some years hence.—*Naval and Military Record*, 18 October, 1922.

FRANCE PLANS TO REBUILD HER NAVY.—Paris—Aiming at the reconstitution of the French Navy, bringing it up to its pre-war strength, but taking into account the limitation imposed by the Washington agreement the minister of marine has elaborated a project calling for the expenditure of about \$20,000,000 yearly for the next twenty years. The plan will be presented to the present session of the chamber of deputies.

Naval experts have recently been laying stress on the fact that France's sea defenses have never been so weak in comparison with other na-

tions since Napoleonic days. Construction was suspended during the war and scores of ships are out of date. A writer in the *Petit Parisien* sums up the total of France's fighting strength as six dreadnaughts, five light cruisers, 38 large destroyers, 41 submarines, with three old style cruisers of the *Voltaire* type (10,800 tons,) ten others of a still older pattern and a dozen or so torpedo boats, practically useless.

As far as coast defense is concerned, none of the heavy batteries has a range beyond ten kilometers (less than four miles). Most of the hydroplanes and other aerial defense weapons are out of date.

Comparing the navies of France and Italy, which were placed on the same footing at the Washington conference, it is found that while the number of dreadnaughts is the same for both, Italy has a much superior light surface fleet in number and quality.

The minister of marines purposes to ask for appropriations for tonnage annually. He will demand provision for 175,000 tons for cruisers; 330,000 tons for light cruisers, torpedo boats and destroyers and 65,000 tons for submarines and small coast defense craft.—*United Press* Dispatch.

FRENCH NAVY NOTES.—Can it be contended that aerial and ballistic progress has rendered fleets obsolete and made maritime power an empty word? Our admirals demonstrated the absurdity of the prevailing idea among the French public that, since aerial bombardment flotillas could operate with ease within a radius of 700 miles from our shores, a French battlefleet is no longer necessary, and our Republic has other means, more economical and effective, of discouraging aggression by any Power. It was shown that the armored fighting ship, though no doubt bound to develop, will ever remain the instrument of the command of the sea and the ultima ratio of seapower.

* * * * *

To react against the anti-battleship tendencies was a vital matter. Not passing crazes of the ignorant public, but the experienced and responsible professional seamen of the *Conseil Supérieur* must dictate the naval policy of the country, and for the immediate present they are in the majority for the battleship.

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Now, what type of battleship to adopt? Considerations of cost and time work against the construction, that has been prepared, of 33,000-ton ships to carry six guns of 18-inch bore (3,300lb. shells), together with up-to-date anti-aerial and anti-submarine defenses, and there appears to be a majority for the completion at St. Nazaire, within twenty months, of the 25,300-ton quadruple-turret *Normandie*, that was laid down in July, 1913, and launched in October, 1914, and was pushed up to 60 per cent of her total completion. As guns and motors are partly ready, the modifications which it is intended to make in the defensive and offensive power would cost a minimum of time and money, and by 1924 the battle fleet would receive a flagship having twice the fighting value of the French type and partly benefiting from the lessons of the war and the data gained in recent experiments in the *Thuringen* and *Prinz Eugen*.

The arguments in favor are that the 25,300-ton quadruple-turret ships, with their 12-inch belt and the armor covering their sides and ends, their three armored decks (to be completed with armor screens against aerial projectiles), their elastic anti-submarine protective devices, compare well from a defensive standpoint with the fine German battleships so much admired in England and in the States. Secondly, the 10 mètres quadruple turrets, with their 15-inch front, afford splendid protection against both projectiles and gases, and can maintain, theoretically, a rate of fire of

eight rounds per turret and per minute, besides training their twelve 13.4-inch guns over a field of 3,400 degrees against only 2,700 for the *Bretagne* and most British ships. In the light of Jutland and Coronel a battery of twelve 13.4-inch guns is deemed superior to one of eight 15-inch weapons—although there is a strong demand for the fitting of the new 18-inch caliber which is the most powerful piece of ordnance in existence.

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A series of interesting maneuvers have just taken place off the coasts of Brittany and Normandy under the supervision of Rear-Admiral Lequerré the active chief of the *Escadre de la Manche*, who flies his flag in the 18,000-ton *Voltaire*, and has under his orders the Brest and Cherbourg torpedo, submarine, and aerial flotillas at the same time as half a dozen gunboats of 800 tons of the *Verdun* type. For the purpose of action on the high sea and of artillery contests such a force would be, of course, ridiculously inadequate, but Admiral Lequerré is, intensely and realistically, training the few thousand seamen under his command for a totally different game: coast defense and attack, the attack of convoys and fleets mostly under the cover of night. Night conditions offer to the weak side its chance, when what matters most is not to be strong and numerous, but to offer a small and elusive target, so much so that, at the time of the craze for *croiseurs corsaires*, a special *tactique de nuit* had been elaborated by the Paris Admiralty for the case of single *corsaires* hurling themselves slap-dash into the very midst of an enemy squadron, with a view to provoking confusion. The significance of the strenuous night training in the French Navy is better gauged when it is remembered that the modern meaning of command of the sea is safe communications. Experience, however, has proved that efficiency for night fighting cannot be improvised, but demands constant practice, special appliances and signalling tactics, together with a perfect knowledge of coasts and sea currents. In night actions, further, the bombardment and scouting avions are the best instruments of surprise as well as of efficient defense. The night, it will be remembered, played a capital rôle in sea transportation in the course of the Great War; it is bound to exercise an even greater influence in future European conflicts that will be decided not by armoured force shining in the sun, but by new unimposing instruments d'offensive stealthily striking in the night, for the reason that they will possess speed and range and be adapted to the novel conditions of warfare.

* * * * *

The discussion round the Washington Treaty is purely an academic affair: ratified or not it will change nothing in the French naval policy, since battleship construction has against it public opinion and financial difficulties. One way to retain the battleship would have been to complete the *Normandie* in replacement of the lost *France*; but that idea has been rejected by the retrograde men of the *Conseil Supérieur*, who have learned nothing by the war and seem content to *jouer au marin* with the old naval recipe, in virtue of which efficiency consists of a nicely-dosed naval mixture: battleships, cruisers, torpedo craft, a few submarines, too, and a coastal organization or *flotte de terre* whose sole *raison d'être* is to find employment for our surplus of 4,000 *officiers de vaisseau* or officers auxiliaries.

So the Raiberti program provides for the construction within twenty years of 175,000 tons of battleships, 330,000 tons of light ships, 65,000 tons of ocean-going submarines; the program, or at least the characteristics of ships to be revised every five years. At first sight it is a practical endorsement of the Washington agreement; in reality it is nothing of the sort. The Washington trick, played upon France without her consent or

knowledge in defiance of common sense and fair play, has against it the unanimity of purely naval opinion. M. Briand, who acted according to his lights, had no power whatever to sign so humiliating a deed of abdication at the hands of nominal allies. It is a question of national sovereignty and pride—a point on which Frenchmen are just as sensitive as Englishmen; and M. Poincaré is certain to vindicate fully France's rights as well as the claims of diplomatic honesty.

Mr. Raiberti's advisers simply want to make a start in the old way, and in a small, unostentatious way, but they have raised a storm of criticisms, coming from all quarters. Those who believe in battleships deride the proposed construction of five ships of 35,000 tons *pour tout potage*, and M. Raiberti's clever mixture they consider as the best up-to-date recipe to procure *faiblesse sur toute la ligne*, expensive powerlessness. Even among flag officers it is agreed that it would be folly to invest 1,500 million francs in a five-unit battle squadron, and that it would be better for France to give up altogether mastodons and to go in for aerial, torpedo, and speed supremacy, that would pay.—J. B. GAUTREAU in *Naval and Military Record*, October 18, 25, and November 1.

GERMANY

GERMAN CAPITAL SHIP AND LIGHT CRUISER BUILDING PROGRAM 1914-18. It has been correctly stated that at the end of the war the Germans were only building *U* boats, torpedo craft and small auxiliaries. When war broke out, however, they had quite a big program on hand, including battleships, battle cruisers and light cruisers. It will be remembered that the German Navy Bills principally dealt with the big ship, and most of the warships in progress in 1914 were replacements of older ships in accordance with those Bills.

It is of interest to note the policy as the war progressed in the light of the ships laid down. When the war broke out the German High Sea Fleet consisted of three battle squadrons, the third of which contained the most modern ships, namely, the *Kaiser*, *Kaiserin*, *König Albert* and *Prinzregent Luitpold*, each of which mounted ten 12in. guns, with fourteen 5.9in. guns as a secondary armament, on a displacement of 24,300 tons. Their maximum speed was 22 knots, and these ships did not compare in offensive powers with contemporary British battleships. The cruiser squadron included only three battle cruisers, the *Seydlitz* and *Moltke*, each mounting ten 11in. guns, and the *Von der Tann*, with eight 11in. guns. There was another battle cruiser, the *Goeben*, in the Mediterranean, but she was too far away to be of value in the North Sea.

It is now proposed to describe the ships in hand when the war broke out. The battleships are detailed in Table I.

From this statement it will be seen that two battleships, the *König* and the *Grosser Kurfürst*, were added to the High Seas Fleet in the first month of the war, whilst two more, the *Markgraf* and the *Kronprinz Wilhelm*, were added before the end of 1914. These four ships were contemporary with the *Emperor of India* class, each of which carried ten 13.5in. guns. In each of these German ships the oil stowage only totalled 700 tons, against a bunker capacity for 3500 tons of coal.

In addition to the above, the battleship *Salamis* was building at the Vulcan Yard, Hamburg, for the Greek Navy, but at the outbreak of war all progress on this ship was suspended. In fact, some of her guns, which were to come from America, were used on the British monitors.

It will be noted that the *Bayern* was completed in April, 1916, and really she set out to meet the German fleet after Jutland. Actually at that battle the most recent battleship on the German side was the *Kronprinz Wilhelm*.

Only two more battleships were commenced by the Germans, and they were part of the 1914-15 program. They were named the *Wurtemberg* and *Sachsen*, and were similar to the *Baden* and the *Bayern*. The former was laid down at the Vulcan Yard, Hamburg, and the *Sachsen* was building by Krupps at their Germania Yard at Kiel. The designed power of these ships was 48,000 shaft horsepower, but actually the *Baden* obtained 55,000 shaft horsepower, and it was anticipated that that figure would be attained in these two later ships.

The *Wurtemberg* and *Sachsen* were both launched in 1917, and after the armor belt was fitted and some of the machinery shipped, the work was stopped so that the two shipyards could devote their energies to U boat construction. The condition of the *Sachsen* can be judged from Fig. 1, which shows this ship as she was when peace was signed. The *Sachsen* was unique, in that her center propeller was to be driven by a Diesel engine of 12,000 brake horsepower. Messrs. Krupps, of Kiel, designed and built the engine, but it was never installed on the ship.

These two battleships, together with other warships building when peace was declared, have had to be broken up in compliance with the Versailles Treaty. The alternative of utilizing the hulls for ordinary mercantile purposes was not a commercial proposition, and accordingly the structures were broken up and the metal sold as scrap.

The principal features of the German warships were described in papers read before the Institution of Naval Architects by Sir E. H. Tennyson D'Eyncourt and Mr. S. V. Goodall in 1921, and for details as to construction and also a comparison with contemporary British warships those contributions should be consulted. It is only proposed to touch on one or two of the salient points. In gun power, ship for ship, the German was invariably behind the British. Much has been said about subdivision, and it must be admitted that the subdivision of the German ships was more minute than in the British ships. The extent to which it was carried can be judged from the fact that the main machinery of the *Baden* was enclosed in fifteen different compartments—nine boiler rooms and six main machinery spaces.

As regards time taken to build, it will be seen from the details given in Table I, that the average time for a battleship was about two and a half years, which is not so good as for British ships of corresponding date.

As previously mentioned, the High Sea Fleet had only three battle cruisers available when hostilities commenced, and, in addition, three more were building and well advanced. These are set out in detail in Table II, given above, by referring to which it will be seen that the battle cruiser strength of the enemy was increased by the *Derfflinger* before the end of 1914, the *Lutzow* in the spring of 1915, and the *Hindenburg* in August, 1915, thus doubling its numbers in the first year of the war. All these ships had 12in. guns as their main armament, being the first German battle cruisers so armed. It is of interest to note that whilst the *Lutzow* could only carry 1,000 tons of oil, contemporary British ships of the same class carried about three times as much. That was due to the oil shortage in the country and was a distinct handicap.

TABLE I

Name	Pro-gram year	Shipyard	Keel laid	Com-pleted	Dis-placement	Horse-power	Speed	Armament	Com-ple-ment
<i>König</i>	1911-12	Wilhelmshaven Dockyard	Oct., 1911	Aug., 1914	Tons 25,390	.....	Knots 21-22	10-30.5 cm. (12 in.), 14-15 cm. (5.9 in.), 10-8.8 cm. H. A. 5 torpedo tubes	1,130
<i>Markgraf</i>	1911-12	Weiser A. G., Bremen	Nov., 1911	Nov., 1914	25,390	.....	21-22	Ditto	1,130
<i>Grosser Kurfürst</i>	1911-12	Vulcan, Hamburg	Oct., 1911	Aug., 1914	25,390	.....	21-22	Ditto	1,130
<i>Kronprinz Wilhelm</i>	1912-13	Krupps Germania Kiel	May, 1912	Dec., 1914	25,390	.....	21-22	Ditto	1,130
<i>Bayern</i>	1913-14	Howaldts, Kiel	Sept., 1913	April, 1916	28,070	55,000, 48,000 (desig'd)	22¼	8-38 cm. (15 in.), 16-15 cm. (6 in.), 2 H. A. 3 torpedo tubes	1,163
<i>Baden</i>	1913-14	Schichau, Dantzig	Feb., 1914	Nov., 1916	28,070	Ditto	22¼	Ditto	1,163

TABLE II

Battle cruiser	Pro-gram year	Shipyard	Keel laid	Com-pleted	Dis-placement	S. H. P.	Speed	Armament	Crew
<i>Derfflinger</i>	1911-12	Blohm and Voss	Mich., 1912	Nov., 1914	Tons 26,180	80,000	Knots 26¾	8-30.5 cm. (12 in.), 12-15 cm. (5.9 in.), 4-50 cm. tubes	1,120
<i>Lützow</i>	1912-13	Schichau, Dantzig	Aug., 1912	Spring, '15	26,600	80,000	26¾	Ditto	1,120
<i>Hindenburg</i>	1913-14	Wilhelmshaven Dockyard	Nov., 1913	Aug., 1915	27,900	80,000	26¾	Ditto	1,120

TABLE III

Battle cruiser	Pro-gram year	Building yard	Date of launch	Dis-place-ment	S.H.P.	Speed	Armament	Crew
<i>Graf Spee</i>	1914-15	Schichau, Danzig	1916	Tons 31,000	90,000	Knots 28	8-35 cm. (14 in.), 12-15 cm. (5.9 in.), 8-8 cm. H.A., 5 torpedo tubes	1,429
<i>Mackensen</i>	1914-15	Blohm and Voss	1916	31,000	90,000	28	Ditto	1,429
<i>Ersatz Freya</i>	1915-16	Blohm and Voss	Not launched	33,000	110,000	29	12-15 cm. (5.9 in.), 5 torpedo tubes	Apprx. 1,500
<i>Prinz Eitel Friedrich (Ersatz A)</i> ..	1915-16	Wilhelmshaven	Not launched	33,000	110,000	29	Ditto	Apprx. 1,500

TABLE IV

Name	Ordered	Displacement	Horsepower		Weight in pounds per H. P.	
			Designed	Attained or anticipated	Designed	Attained or expected
Battleship:		Tons				
<i>Oelfriedland</i>	1908	22,800	28,000	35,500	139	111
<i>Wurtemberg</i>	1914	28,700	48,000	55,000	93.5	81.5
Battle cruiser or armored cruiser:						
<i>Blücher</i>	1906	15,500	36,200	44,000	131	108
<i>Ersatz Yorck</i>	1915	33,500	90,000	110,000	79.4	64.8
Light cruisers						
<i>Enden</i>	1907	3,500	15,000	16,350	119.0	109.0
<i>Köln</i>	1916	5,600	31,000	50,000	93.5	58.0

TABLE V.—*Light Cruisers, Built and Building, 1914-18*

Name	Pro-gram year	Building yard	Launched	Dis-placement	Speed	Armament		Comple-ment	Disposal
						Guns	Tubes		
<i>Graudenz</i>	1912-13	Kiel Dockyard.....	Oct., 1913	Tons 4900	Knots 29	12-10.5 cm. (4. in.), 2 M.G.	2	385	Italian Navy as Ancona
<i>Regensburg</i>	1912-13	Weser A. G.....	April, 1914	4900	29	12-10.5 cm. (4. in.), 2 M.G.	2	385	French Navy as Strassburg
<i>Pillau</i> (Russian <i>Muraugew Amurski</i>).....	.....	Schichau, Dantzig... ..	1914	4400	27.5	8-15 cm. (5.9 in.), 4-5.2 cm. (2 in.)	2	437	Italian Navy as Bari
<i>Elbing</i> (Russian <i>Admiral Nevelsk</i>).....	.....	Schichau, Dantzig... ..	1914	4400	27.5	8-15 cm. (5.9 in.), 4-5.2 cm. (2 in.)	2	437	Sunk at Jutland
<i>Königsberg</i> (<i>Ersatz Gazelle</i>).....	1914-15	Weser A. G.....	1915	5300	27.5	8-15 cm. (5.9 in.), 2-8.8 cm. (3.5 in.) H.A.	4	475	French Navy as Metz
<i>Wiesbaden</i> (<i>Ersatz Gefion</i>).....	1913-14	Vulcan, Stettin.....	1915	5150	27.5	8-15 cm. (5.9 in.), 4-5.2 cm. (2 in.) H.A.	4	480	Sunk at Scapa Flow
<i>Frankfurt</i> (<i>Ersatz Hela</i>).....	1913-14	Kiel Dockyard.....	1915	5150	27.5	8-15 cm. (5.9 in.), 4-5.2 cm. (2 in.) H.A.	4	480	Sunk at Jutland
<i>Karlsruhe</i> (<i>Ersatz Nube</i>).....	1914-15	Kiel Dockyard.....	1916	5300	27.5	8-15 cm. (5.9 in.), 2-8.8 cm. (3.5 in.) H.A.	4	475	Sunk at Scapa Flow
<i>Emden</i> (<i>Ersatz Nympha</i>).....	.....	Weser A. G.....	1916	5300	27.5	8-15 cm. (5.9 in.), 2-8.8 cm. (3.5 in.) H.A.	4	475	Sunk at Scapa Flow
<i>Nürnberg</i> (<i>Ersatz Thetis</i>).....	.....	Howaldts, Kiel.....	1916	5300	27.5	8-15 cm. (5.9 in.), 2-8.8 cm. (3.5 in.) H.A.	4	475	Sunk at Scapa Flow
<i>Köln</i> (<i>Ersatz Ariadne</i>).....	.....	Weser A. G.....	1916	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. 23.5 in. revolving	525	Sunk at Scapa Flow
<i>Dresden</i> (<i>Ersatz Dresden</i>).....	.....	Weser A. G.....	1917	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	Sunk at Scapa Flow
<i>Wiesbaden</i> (<i>Ersatz Nürnberg</i>).....	.....	Vulcan, Stettin.....	1917	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	Sunk at Scapa Flow
<i>Rostock</i> (<i>Ersatz Mainz</i>).....	.....	Vulcan, Stettin.....	1918	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	Broken up in accordance with Peace Treaty
<i>Magdeburg</i> (<i>Ersatz Magdeburg</i>).....	.....	Howaldts, Kiel.....	1917	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	
<i>Frauenlob</i> (<i>Ersatz Königsberg</i>).....	.....	Kiel Dockyard.....	1918	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	
<i>Leipzig</i> (<i>Ersatz Leipzig</i>).....	.....	Weser A. G.....	1918	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	
<i>(Ersatz Emden)</i>.....	.....	Weser A. G.....	1919	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	Launched to clear slips and then broken up
<i>(Ersatz Köln)</i>.....	.....	Weser A. G.....	1919	5600	27.5	8-15 cm. (5.9 in.), 3-8.8 cm. (3.5 in.) H.A.	4-60 cm. (23.6 in.) revolving	526	

TABLE VI
Date of launch given for vessels completed or launched in brackets

Shipyards	Ships completed, August, 1914—November, 1918			Ships in hand, November, 1918			Remarks
	Battleships	Battle cruisers	Light cruisers	Battleships	Battle cruisers	Light cruisers	
Wilhelmshaven Dockyard. Kiel Dockyard.	<i>König</i> (1913)	<i>Hindenburg</i> (1915)	<i>Graudenz</i> (1913) <i>Frankfurt</i> (1915) <i>Karlsruhe</i> (1916)		<i>Ersatz A</i>	<i>Frauenlob</i> (1918)	
Krupps Germania, Kiel.	<i>Kronprinz Wilhelm</i> (1914)			<i>Sachsen</i> (1917)		<i>Magdeburg</i> (1917) <i>Wiesbaden</i> (1917) <i>Rostock</i> (1918)	
Howaldts, Kiel.	<i>Bayern</i> (1915)		<i>Nürnberg</i> (1916) <i>Wiesbaden</i> (1915) <i>Breslau</i> (1917)	<i>Salamis</i> * <i>Württemberg</i> (1917)			*Building for Greek Government stopped
Vulcan, Hamburg.	<i>Grosser Kurfürst</i> (1913)				<i>Mackensen</i> (1916) <i>Ersatz Freya</i>		
Blohm and Voss, Hamburg.		<i>Derfflinger</i> (1913)	<i>Brunner</i> (1917)				
Schichau, Danzig.	<i>Baden</i> (1915)	<i>Lutzow</i> (1913)	<i>Pillau</i> (1914) } <i>Elbing</i> (1914) }		<i>Graf Spee</i> (1916)		†Originally ordered by Russian Admiralty
Weser A. G., Bremen.	<i>Markgraf</i> (1913)		<i>Regensburg</i> (1914) <i>Königsberg</i> (1915) <i>Emden</i> (1916) <i>Köln</i> (1916) <i>Dresden</i> (1917)			<i>Leipzig</i> (1918) <i>Ersatz Köln</i> (1919) <i>Ersatz Emden</i> (1919)	

The German Admiralty was impressed with the battle cruiser type and had provided for two ships of that class in 1914-15 and in 1915-16 also. Particulars are given in Table III.

In addition, there was certainly one more battle cruiser just started, the *Ersatz Yorck*, probably at Schichau, Dantzig, and possibly two more, included in the 1916-17 program, but never started owing to the concentration on *U* boat construction.

There were several interesting features in these large cruisers. The *Graf Spee* and *Mackensen* were to have 35 cm. (14in.) guns and would have been the first battle cruisers to mount a gun larger than 30.5 cm. (12in.), whilst the *Ersatz A* and *Ersatz Freya* were designed to carry 38 cm. (15in.) guns, and so were in line with the British battle cruisers built during the war. The horsepower and speed were also slightly increased. The *Ersatz A* had four propellers, each of which was independent. The 110,000 shaft horsepower was evenly distributed between the four shafts. As originally designed, a Föttinger hydraulic transmission—turbo-transformer—was to be used. The turbines themselves were to run at 1,360 revolutions per minute, and there was a reduction of 4.3 to 1 by means of the transformer, so that the propellers made 315 revolutions per minute at full speed. It is claimed that the efficiency would have been very good. Actually, however, German engineers have for some time favored mechanical reduction gear, and it is being fitted to all classes of ships at present. The *Graf Spee* and *Mackensen* were to be fitted with mechanical reduction gear and the shaft horsepower of 90,000 was to be divided over four quite independent shafts.

In these battle cruisers the main machinery compartments were relatively small, owing to the excessive subdivision. The condenser and auxiliary machinery would be in a separate compartment from the main turbines for each shaft, and thus there would be eight engine rooms.

In light cruisers the High Sea Fleet was weak, judged from the standard set up as the war progressed. There were only six of the *Town* class in the cruiser squadron: viz., the *Köln*, *Mainz*, *Stralsund*, *Kolberg*, *Rostock*, and *Strassburg*. Each of these ships displaced 4,500 tons, carried twelve 10.5 cm. (4.1in.) guns, and had two revolving torpedo tubes on the upper deck. They could steam at 27 to 28 knots. There were also five others of approximately the same dimensions on the trade routes or attached to Admiral Von Spee's squadron, whilst the *Breslau* was attached to the *Goeben* in the Mediterranean.

The light cruisers built during the war and in hand when the war ended are shown in Table V given above. The losses in this class of vessel in actual service were considerable, and the new cruisers were generally first named *Ersatz*, or replace. It will be seen in the table that two of the cruisers building at Weser A. G. when the war ended were the *Ersatz Emden* and the *Ersatz Köln*. The light cruisers in hand at the Armistice were all of one class, and the following particulars of this class may be of interest. The length was 489ft., the beam 47ft., and the displacement 5,600 tons at 16ft. 6in. draught. The fuel carried was 1,118 tons of coal with 682 tons of oil. There were fourteen boilers in five boiler rooms, of which eight burned coal and oil and six burned oil only. The shaft horsepower of 29,000 gave a speed of 27.5 knots. The armament consisted of eight 15 cm. (5.9in.) and three 8.8 cm. (2.5in.) high-angle guns and four single 60 cm. (23.6in.) revolving deck torpedo tubes. The side protection was about 2½-inch thick and protective deck about ¾in. thick. The complement was 526.

In addition, two special light cruisers were built for minelaying, named the *Brummer* and the *Bremse*, by Blohm and Voss and Vulcan, Stettin, respectively. These ships were designed for high speed, and some ma-

chinery on order by the Russian Admiralty, which was in hand in Germany when war broke out, was utilized to save time. The *Bremse* was built in twelve months. Each vessel could carry 300 mines and the armament included four 15 cm. (5.9in.) and two 8.8 cm. (3.5in) high-angle guns and two deck torpedo tubes. The speed obtained was 30 knots, and these cruisers were intended for mine-laying at a distance, their offensive powers being sufficient to enable them to make a fight against an isolated cruiser if necessary.

Of the light cruisers left in Germany after the Armistice a number were surrendered to the Allies and incorporated in the Italian and French Navies and re-named as indicated in Table V. These ships were mainly the cruisers completed after the Battle of Jutland. Those not complete had to be broken up in accordance with the Peace Treaty.

It is interesting to note that three light cruisers were launched in 1914 and in 1915, four in 1916, three in 1917 and 1918, and two in 1919, to clear the shipways at Weser A. G. shipyard. Before closing this section we would draw attention to the short summary given in Table IV, which shows the progress in size and horsepower of the various classes of ships.

The distribution of this warship building work over the various shipyards is of interest. The submarines were built in nearly every shipyard, with the exception of Vulcan Yard at Stettin and the Schichau Yard at Danzig, which were employed on torpedo boat construction.

The *U* boat program made the biggest demands on the German shipyards, and next to it came the torpedo craft; but, as will be seen above, the capital ship and light cruiser program was quite considerable.

Adding these three programs together one can get a good idea of the capacity of the shipbuilding industry in Germany working at full pressure. All this capacity is now available for mercantile work, as the post-war building allowed for the navy by the Peace Treaty is very small indeed, and Germany may not build warships for foreign Powers.—*The Engineer*, 13 October, 1922.

THE DANZIG YARD.—The fate of the Danzig yard, which formerly was one of the most important German Imperial Dockyards, has now been decided. The yard and the plant for building railway rolling stock will be taken over by a new limited company for a term of fifty years. The share capital of this company is reckoned in British currency, thirty per cent of the capital being taken by a British group, thirty per cent by French capitalists, twenty per cent by Polish capitalists, and twenty per cent by a Danzig group of financiers. The yard embraces three building berths for ships up to 330ft. long and three floating docks with a lifting capacity of 8,000, 3,500 and 1,000 tons respectively. One of these docks may be used as a building berth, being provided with special cranes for that purpose. The vessels are completed afloat with the aid of a 100-ton floating crane. The workshops of the yard are very well equipped. Marine steam engines, hot-bulb motors, and auxiliary machinery, such as pumps and winches, may be built in the engineering department.—*The Shipbuilder*, November, 1922.

OPERATIONS FOLLOWING THE BATTLE OF JUTLAND.—Admiral von Scheer, who might be called the German Beatty, a strong advocate of the offensive at sea, had succeeded the cautious Admiral von Pohl on January 18. After President Wilson's note about the *Sussex*, the Kaiser and his advisers decided to abandon their ruthless submarine policy, and on April 24, Scheer was instructed by his Government that thereafter his submarines were to obey prize law, visit and search their victims before destroying them. Scheer replied that he would not permit his *U* boats to

operate under such restrictions, and sent immediate wireless instructions to the commerce-raiding submarines under his command, which included all those not in the Mediterranean area, to return to the base. The submarines came back, and Scheer worked out a plan by which he hoped to lure the British fleet from its bases into *U* boat traps. He decided to cross the North Sea toward England with the High Seas armada after the trap had been set. Twenty-two submarines were ordered to station themselves off British ports by May 23, and await developments. Two *U* boats lay off Scapa and seven off the Firth, where Beatty's hated Cat Squadron and the Fifth Battle Squadron were. One submarine was off Cromarty, one off the Tyne, two off the Humber, one south of the Dogger Bank. With the Scapa submarines was a mine layer, the *U-75*, and she carried a full cargo. On May 29 she discharged her mines off the Orkneys; eight days later the *Hampshire* struck one of these mines and Lord Kitchener perished.

Scheer depended on his Zeppelins to give him warning of the approach of the Grand Fleet when he crossed the North Sea. But on the morning of May 30 the weather was misty, so Scheer altered his plan and steered north along the coast of Norway, thinking this safer. How the Grand Fleet came out and what followed off Jutland the world knows: the new fact of interest is that Scheer's strategic plan failed. He brought out his fleet hoping to bag some British warships with waiting submarines, and not one fell a victim. It is of interest, also, to discover that Admiral Jellicoe was mistaken in thinking that submarines were operating with the High Seas Fleet or in its rear. There were none there at all; all the submarines available had been concentrated off the British ports.

But Scheer was not discouraged by Jutland. He had been very lucky, he knew, but he had inflicted more loss than he suffered. And he was greatly influenced by Admiral Jellicoe's turn away and by the evident British disinclination to face risks that could be avoided. After some controversy with Berlin, where Jutland had made the Government very nervous, he was permitted to plan a bolder repetition of Jutland for the month of August.

This Jutland that never was fought constitutes an operation of surpassing interest, and one that the public has never been told anything about. There were excellent reasons at the time on both sides for silence. Scheer revived his project, abandoned the first time because of mist, for a visit to the English coast. He thought that the lack of success of his submarines before Jutland was because they were then lying doggo in waters particularly well protected and in which danger was especially apprehended by the English. Accordingly, he planned to bring his fleet across to Sundrland, and Sunderland will be interested to learn that his battle orders included a bombardment of that city by almost the whole fighting strength of the German Navy, to be carried out if the British fleet did not arrive in time to prevent it.

The German admiral placed his submarines in lines stretched across tracks which he expected Jellicoe and Beatty to cross as they sped down the coast to intercept him. Six *U* boats lay off Blyth, six more were stationed off the Yorkshire coast, and two lines of submarines off Terschelling, on the theory that the British fleet would chase the Germans home.

On the evening of August 16, the High Seas Fleet shaped course for Hartlepool. Scheer left the Second Squadron to guard the Bight. He had with him the new battleship *Bayern*, not finished when Jutland was fought, and the *Grosser Kurfürst* and *Markgraf* in place of the *Derfflinger* and *Seydlitz*, which had been too badly hammered to reappear. These ships went ahead with the battle cruisers. The dreadnaughts followed

twenty miles behind, and eight Zeppelins hovered overhead. But the Admiralty was not caught napping; indeed, Jellicoe had come out even before the Germans sailed. At 5 o'clock the same afternoon the Grand Fleet started down the east coast. Moreover, the *E-23*, waiting in the middle of the North Sea on the German's course, torpedoed the *Westfalen* twice. Scheer sent his stricken ship home, and carried on.

During the night Beatty's Cat Squadron came out and was proceeding south thirty miles ahead of the Grand Fleet when, at 5.55 in the morning, the Second Light Cruiser Squadron, which led the van, ran into the first line of submarines off the Farne Islands. The *Nottingham* was torpedoed twice. News of this at once reached Jellicoe, who ordered the Grand Fleet to turn around and made north, away from the enemy. This maneuver might have been still more criticized than the Jutland turn away, but the Admiralty has never told about it. Meanwhile the *Nottingham* was torpedoed again before she could get to port and sank. Tyrwhitt's Harwich flotilla was out, and sighted the enemy at 6.30 A.M., but could not attack unsupported. Scheer kept steadily on his course all the morning, fully informed by his Zeppelins of where the British squadrons were and what they were doing.

Some four hours after the loss of the *Nottingham*, Admiral Jellicoe decided to cover Newcastle. At noon he was ninety-five miles east of the Farne Islands, with Beatty ahead of him, steering SSE., and the German fleet ninety miles east of Whitby and still coming on. At 12.30 Beatty's squadrons were off Newcastle, forty-two miles from the enemy, but here Scheer thought things were getting too hot, turned south, pushed off the Harwich "light stuff" that was hanging to his flank, and started home at 2.35 P. M.

Admiral Beatty was off in pursuit, but Jellicoe signaled him before 3 to turn back at 4 o'clock, because of submarine danger. At 3.20 P. M. the commander-in-chief, on receiving a report of a submarine, ordered Beatty to turn back immediately. While returning, an hour and a half later, the light cruiser *Falmouth* was sunk by *U-66*. Tyrwhitt kept after the Germans all the afternoon, and remained in touch, but could not do more unsupported. His orders from Jellicoe to make a night attack could not be carried out because of bad weather, and Scheer returned scatheless excepting for the damaged *Westfalen*. Nothing has ever been told the British public about this unfought Jutland, though communiques were issued announcing the loss of the two cruisers sunk.

Scheer was delighted with what he considered his successful day out, and planned another. But German policy had changed again: in October it was decided to resume unrestricted submarine warfare. Scheer's submarines accordingly had to be released for onslaughts upon merchant shipping. Without submarines, there seemed no purpose in risking the fleet again, since not even Scheer ever contemplated a general action unless forced into one, or unless the English attacked the Bight.—Newspaper Clipping.

UNITED STATES

BUILDING PROGRAM.—London, October 19.—The shipbuilding program which the United States Navy Department is reported to have in contemplation is decidedly a modest one. According to a Washington dispatch printed in *The Sun* on July 24, the department's policy is to build only enough tonnage of various types to round out the navy and maintain it on the same relative footing with the British and Japanese fleets.

To this end it is proposed (1) to speed up the completion of the ten light cruisers now building and seek authority for starting work on a sufficient additional number to keep pace with Britain and Japan; (2) lay

down "several" submarines of the scout and mine-laying type, besides finishing the three fleet submarines now under construction; (3) accelerate the expansion of the navy's air force by developing new airplane types, completing the two big dirigibles now on order, the one in Germany and the other at Lakehurst, N. J., and expediting the completion of the two battlecruisers which are being rebuilt as airplane carriers.

Judging from the dispatch referred to above, Navy Department officials believe that these measures will safeguard that status quo in auxiliary fighting ships which it is as imperative to maintain as the battleship ratio if the Limitation Treaty is to be renewed on the same lines at some future date. To foreign observers, however, it seems very doubtful if the department's program is comprehensive enough for this purpose.

In previous articles I have given full and authoritative details of Japan's post-conference construction, and shown that when all the cruisers now building and authorized are ready for service that country will have at sea no fewer than twenty-nine modern vessels of this type. The United States, on the other hand, will have only ten—unless additional ships are authorized, laid down and built with the minimum of delay. As matters stand at present, the numerical ratio in light cruisers is enormously to the disadvantage of the United States, being in fact as 1 to 3.

If, therefore, the American naval chiefs wish to bring their auxiliary tonnage ratio into line with that stipulated for capital ships, they must be prepared to legislate for the construction of about forty new cruisers during the next two or three years! Whether such a program would be feasible is for them and the American taxpayers to decide. So far as destroyers are concerned the United States is holding her own, but the submarine position is much less favorable. On paper the American total of these boats is considerably larger than the Japanese, but more arithmetical computations of the "nose counting" order afford no true index to fighting power where modern naval material is in question.

When the respective submarine establishments are analyzed a very different position is revealed. Leaving out of count small boats, which would be only good for coast defense and practically useless for the long-range service which has become the real *métier* of underwater craft, an examination of the data shows Japan to have built, building or on order a total of seventy-one ocean-going submarines, as compared with fifty-six similar boats completed or building for the United States. And boat for boat the later Japanese submarines are superior to the American in tonnage, radius and armament.

Since writing my last article on this theme further information has reached me on the progress of Japanese submarine construction. In the course of last year fifteen boats were completed: viz., Nos. 38, 39, 40 and 41 at Yokosuka; 34, 35, and 36 at Kure; 29, 30, 31, 32 and 33 at Kobe; 43 and 45 at Sasebo, and 42 at Maizuru. No. 44 was put afloat on November 29, 1921, and in the same month work began on No. 62. During the present year upward of twelve boats have been commenced, comprising seven of 900 tons and five of 1,500 tons. Submarine No. 72 described as a 2,000-ton vessel with a cruising range of 16,000 miles, to be armed with two guns, sixteen torpedoes, and a supply of mines, is reported to have been laid down last June. At least five other boats of this class were then contracted for, and if not already under construction will be on the stocks at an early date.

Including the series of 1,500-tonners now building, the number of "submersible cruisers"—that is, boats displacing more than 1,500 tons or more when in surface trim—which Japan has actually ordered up to the present is not less than ten, while twelve boats out of the twenty-four contained in the new program will probably be of the same formidable type,

giving an aggregate of twenty-two submarines of the very largest design. Against this fleet of underwater monsters the United States has only the six fleet submarines, *T 1* to *T 3* and *V 1* to *V 3*, displacing 1,106 and 2,025 tons respectively. Of the other 100-odd American submarines which remain on the active list, all displace less than 1,000 tons on the surface, and half of them are less than 600 tons.

Another fact to be noted is the remarkable rapidity with which Japanese dockyards are now turning out submarines. For example: No. 62, which was laid down in November last year, was launched April 13, 1922, in a fifty-three per cent state of completion, and is scheduled for delivery in the coming December, complete for sea in every respect, with her full equipment and armament on board. The building period for the new 1,500-ton class as specified by the contracts is fifteen months, and for the 2,000-ton boats, eighteen to twenty months. In America the construction of much smaller boats has hitherto occupied thirty to thirty-six months.

Needless to say, the difference is attributable not to any superior resources or mechanical skill on the part of Japanese shipbuilders, but to the financial arrangements which govern naval construction in the two countries. In Japan the authorization of a new war vessel of any type involves the immediate appropriation of a sum of money sufficient to cover the entire cost of the work, with a margin over to allow for extras. As for the system adopted in the United States, it is unnecessary to explain this to American readers, but the result is seen in the present long list of war craft, from battleships to submarines, on which work has had to be slackened or stopped entirely, owing to shortage of funds. Last spring, for instance, all work was suspended on the light cruiser *Omaha*, because the available funds had run out, the consequence being that the delivery of this ship, which is one of a type most urgently needed by the United States fleet, has been postponed indefinitely.

The *Omaha*, it may be recalled, was begun as far back as December, 1918, so that she will soon have been four years in the builders' hands. The *Marblehead* and *Memphis*, begun in the fall of 1920, have not been reported as launched at the moment of writing, and on July 1, this year, their percentages of completion were officially returned at 33.5 and 26.5.

At the same time the completion dates of the *Omaha*, *Milwaukee*, *Cincinnati* and *Raleigh* were stated to be "indefinite."

Bearing in mind the fact that none of the ten American cruisers begun in 1918-20 has yet come into service, and that the last of them can hardly be completed for another year, it is instructive to compare this with what the Japanese have done in the corresponding period. The cruisers *Tama* and *Kuma*, started only four months before the *Omaha*, were both commissioned in August, 1920; the *Kiso*, *Kitakami* and *Oh-i*, laid down in the second half of 1919, were all in service before October, 1921; the *Isudzu* and *Nagara*, begun in August-September, 1920, were completed in nineteen to twenty months; the *Yura*, laid down May 21, 1921, was launched February 15, 1922, and is timed to run her trials this November.

In all, Japan has built and completed eight light cruisers since the summer of 1918 and has four others in an advanced state of completion, while about six more are in an earlier stage of building. If this rate of progress is to be maintained, it is difficult to see how the United States can hope even to draw level with Japan in respect to auxiliary fighting ships, let alone "beat her to it" by attaining a lead in this class of tonnage equivalent to the battleship ratio. Yet if the views of the Navy Department have been rightly interpreted, nothing less than this will satisfy American naval experts.

As a matter of fact, a proportion of 5 to 3 in fast cruisers and long-range submarines would be utterly inadequate for the United States if

she found herself at war with Japan. To achieve any decisive result at sea a preponderance of at least 2 to 1 would be indispensable. No reasonable doubt exists as to the purpose for which all these swift Japanese cruisers and huge underwater boats are being built. Cruisers of 7,500 and 10,000 tons and submarines of 1,500 to 2,000 tons assuredly are not intended primarily for defense. They are designed for attacking an enemy's communications and merchant shipping, for carrying out raids overseas, and generally for offensive operations at a great distance from their home ports.

There is Japanese evidence on this head, for the influential Tokio journal, *Chugai Shogyo*, commenting in April, 1920, on the American cruiser program, wrote as follows: "The American naval authorities lay special emphasis on the necessity of having a high speed for these ten cruisers, and it can well be imagined what is the objective of American naval policy. Is it not an undisguisable fact that since the end of the World War America has been trying to devote her efforts to the Pacific? Unlike the cruisers hitherto built, those now proposed are to be of a specially large type so that they can conveniently cruise oceans. These facts should be duly noted by all interested in the future of Pacific questions." Now, as some of the latest Japanese cruisers will be as large as the American *Omaha* class, and others considerably larger, it is manifest that they, too, "can conveniently cruise oceans," and ships do not cruise about the ocean in war time merely for pleasure.

Owing to its lack of properly fortified bases in the Western Pacific, the American fleet would require in war a very numerous force of cruisers to guard its communications and hunt down enemy raiders, while it would also need very many long-range submarines for scouting, blockade and patrol duties. At present it has neither the one nor the other.

Everything turns, of course, on the possibility of a war being fought in the Pacific, as to which there is notoriously a sharp cleavage of opinion—though not among naval men or students of Far Eastern politics. If we admit such a war to be a possibility of the future, there can be no question as to the glaring insufficiency of America's naval preparations. With her present resources she would not, humanly speaking, stand the remotest chance of waging successful war against Japan, and, unless I am greatly mistaken, American naval officers will be the first to concur in this opinion.—Hector C. Bywater in *The Baltimore Sun*, 5 November, 1922.

COMPETITION IN CRUISERS.—Washington, November 7.—The Navy Department is fully advised of the Japanese auxiliary naval program, as outlined today in cable dispatches to *The Sun*, from Hector C. Bywater, and while lack of appropriations prevents this country from keeping pace in the construction of cruisers and submarines, it is said in naval circles that no concern is felt over the Japanese construction.

Admiral Baron Kato, it was explained here today, gave a general outline of the Japanese program several months ago. Officials of the Navy here are advised that since 1918 Japan has ordered or constructed twenty-five cruisers, several of them displacing 10,000 tons, while others displace 7,000, with a mounted battery of not exceeding eight guns.

This, it is said, is in accordance with the understanding at the arms conference regarding additional construction of cruisers and submarines. No limitation was placed on the number of such vessels, but the tonnage of the cruisers was limited to 10,000 tons.

The United States now has under construction ten light cruisers of the *Omaha* class. It also has under construction or ordered thirty submarines, as compared with the sixty-nine Japan is building. The Navy De-

partment will ask inclusion in the next budget of authorization for at least three ocean-going submarines and three mine-laying submarines.

The Bywater cable was read today by officials of the Navy Department, who commented that while Japan undoubtedly is building more extensively than the United States, she is entirely within her rights. Construction by the United States has been curtailed by the "economy program" in Congress and arguments there that the naval strength of America is such that she need not grow concerned over the temporary spurt of the Japanese nation.

The Navy itself would like a more liberal construction policy, but the responsibility rests primarily with Congress since that body holds the purse-strings.—*Baltimore Sun*, 7 November, 1922.

REORGANIZATION OF GOVERNMENT DEPARTMENTS.—A number of stories have appeared in the press about the so-called reorganization of the government departments as the result of the studies made by the Brown Committee.

Well-informed newspaper men do not believe, however, that there is any prospect of any definite action being taken upon this bill during the life of the present Congress and its appeal to the next Congress is decidedly doubtful.—J. B. H.

RELIEF SHIPS ORDERED TO CHILE.—By order of the President of the United States, the U. S. S. *Cleveland* and the U. S. S. *Denver* have been directed to proceed to the region in Chile recently devastated by an earthquake. The *Cleveland* will probably be able to leave the Canal Zone within twenty-four hours after receipt of her orders. The *Denver*, now enroute to the Canal Zone, will reach her destination and probably be ready to sail within four days. It will require these ships about nine days to reach Chilean ports. The vessels will carry certain supplies and Navy stores available at Panama for emergency use should they be required. Their destination will be Huasco, a Chilean city some distance north of Valparaiso. At that point they will be guided by the necessities of the situation.

Each ship has aboard one medical officer, and one extra doctor will be taken from the Canal Zone.—J. B. H.

JAPAN

JAPAN WILL IMPORT OIL FOR HER NAVY.—With all the drastic military and naval reductions that may be realized, the question of naval fuel will remain as far from solution as before, states an authority in a Tokio dispatch in the *New York Herald*. The Government long has been striving for the realization of self-sufficiency, but with the gradual diminishment of the annual output and the waning prospects of oil exploitation the Government will for a long time have to cling to the old policy of hoarding imported oil.

The domestic output amounted some years ago to about 450,000 tons per annum, but the amount has dropped to less than 300,000 tons. So considerable a portion of this output is refined into lighting oil that very little fuel can be obtained out of this limited domestic product. The repeated experimental boring in the oil fields of Formosa and Saghalien have completely failed and the Government has decided to employ several additional special vessels for the importation of fuel oil, mostly from Borneo. Imports from America this year amounted already to 100,000 tons and from Borneo to 350,000 tons.—*Baltimore Sun*, 12 November, 1922.

JAPANESE MEN-OF-WAR TO PATROL SIBERIAN COAST.—11 September, 1922.—According to the Japanese press, the Japanese Government has announced that Japanese war vessels will be kept in readiness off the Siberian coast after the withdrawal of the Japanese troops from Siberia to protect Japanese residents there in case of necessity.

MERCHANT MARINE

SCHOOL FOR MERCHANT MARINE ENGINEERS OPENED BY NAVY.—Under the direction of Commander H. H. Norton, U. S. N., a school for merchant marine engineers is being conducted at the fuel testing plant at the Philadelphia Navy Yard. The school originated through a letter the Secretary of the Navy wrote to the chairman of the Shipping Board in which he offered to give engineers of the government ships instruction in oil fuel burning. Private ship owners were advised of the plans of the Navy Department and now the prospects are that a permanent school will be developed at Philadelphia at which short courses in oil burning will be given to merchant marine engineers.—*Army and Navy Journal*, 28 October, 1922.

COMMISSIONER CHAMBERLAIN ON OBJECT OF SUBSIDY BILL.—In an address to the City Club of Washington on the situation of our merchant marine, Commissioner George E. Chamberlain, of the Shipping Board, pointed out that American flag vessels carried less than one-third of our total competitive overseas commerce of 40,000,000 tons. Continuing he said:

"One of the primary objects of the effort to provide compensatory legislation for American shipping is to increase to approximately fifty per cent the activities of our vessels in our foreign trade overseas. This result cannot be obtained by mere weight of ship tonnage thrown into the trade.

"Suitable vessels for the specific services must be provided which will classify with the best of our competitors. These vessels would carry a lower insurance rate, provide safety and speed in deliveries and obtain the confidence of both foreign and domestic merchants and importers. This latter feature is sadly lacking from our overseas trade, owing to the fact that our present serviceable ships were designed for a particular and urgent emergency and constructed with scarcely a thought to their ultimate usage in peace time commerce.

"The cream of the import trade of the United States is carried in foreign flag vessels and the low valued imports carrying necessarily a low freight rate are the portion of the vessels under the American flag. This condition is readily seen by comparison of the six months' business of vessels under the British, French, Japanese and Dutch flags, with the American vessels; of the total tonnage of imports Great Britain brought in 15.5 per cent of volume and 35.7 per cent of value. France 1 per cent of volume and 5.3 per cent of value. Japan 9 per cent of volume and 8 per cent of value, Holland 1.3 per cent of volume and 3.7 per cent of value, while American vessels brought in 67 per cent of volume representing 34 per cent of the total value.

"The high grade imports are represented by manufacturers, silk, tea, spices, art objects, etc., and are preferably shipped on fast vessels, the sugar and fruit cargoes forming the bulk of the intermediate class, are carried on foreign flag vessels chartered by American companies, as the operating costs of these vessels are so much lower that only by this means can the cargoes be profitably handled."—*The Nautical Gazette*, 4 November, 1922.

AMERICAN SHIPPING NOT LOSING GROUND.—From time to time we have in these columns called attention to the fact that, contrary to the prevailing impression, the proportion of our foreign trade carried in American bottoms is no longer dwindling. It ceased declining about six months ago and has been slowly rising since then. The Department of Commerce has recently issued detailed figures of our foreign carrying trade and of the tonnage entered and cleared at American ports in connection therewith during August last. In that month 46.77 per cent of the total tonnage in question flew the American flag as compared with 45.65 per cent in the same month of 1921, while the percentage of our water-borne foreign commerce carried in American vessels was 35.78 per cent this year as compared with 34.95 per cent in August, 1921. Although the gain recorded is not much to boast of, it denotes progress in the right direction and a turn for the better in our shipping situation. That our merchant marine, despite the existing intense shipping depression and the unprecedentedly unremunerative freight rates at present prevailing, should have been able to more than hold its own recently is a cause for congratulation and goes to disprove the predictions of those who have been prophesying for some time past that our shipping would suffer as rapid an eclipse as in the period after the Civil War.

In the absence of detailed information it is impossible to say whether the slightly improved showing of American flag vessels in the foreign trade of the United States is due to the activities of the Shipping Board or of private shipping companies. It is beyond all question that there was a very marked gain during July and August in the tonnage of American vessels entering and clearing in the foreign trade at United States ports, whereas in the fiscal year ended June 30, an almost uniform decline occurred. Prognostications as to the future are always risky, especially in times of economic unsettlement and fluctuating exchanges like the present. But this year's poor grain crops in France and parts of Central Europe make it certain that our farmers will find a ready market for their agricultural products, which form three-fourths of our exports to the Old World. This should help to swell the volume of our foreign trade and enlarge the opportunities for the employment of our shipping. Skeptics about America's maritime future may contend that the relatively favorable showing of our tonnage during recent months has been due to the Shipping Board running its vessels at a loss and that were its non-paying cargo carriers to be retired from operation, ships under the Stars and Stripes would not figure nearly so largely in our foreign trade. Against this must be offset the fact, however, that three-quarters of our overseas shipments transported in American bottoms are carried in privately owned vessels which would certainly fall heir to a considerable percentage of the trade now handled by Shipping Board freighters were these to be retired from service.—*The Nautical Gazette*, 11 November, 1922.

"MAJESTIC" DRY DOCKING AT BOSTON NAVY YARD.—The mammoth White Star liner *Majestic*, which is 956 feet long and weighs 64,000 tons, is to be dry docked this week in the Boston Navy Yard dock number three. This is the largest graving dock in existence and has an over-all length of 1,204 feet. It is the only one capable of accommodating the giant vessel.

The floating dry dock at Hamburg, on which the *Majestic* was placed last April before leaving for her trials in the North Sea, has not been considered by the White Star Line because the River Elbe from Cuxhaven to Hamburg is too shallow for the huge liner to navigate safely, while the Gladstone dry dock at Liverpool has silted through the shifting sands

and can now only be used as a wet dock.—*The Nautical Gazette*, 18 November, 1922,

ENGINEERING

PROGRESS IN LIQUID FUELS.—So vast is the problem of liquid fuels that close upon one hundred communications, some of them of a particularly important character, were presented at the International Congress organized by the Société de Chimie Industrielle, and held recently in a temporary exhibition building erected on the Esplanade des Invalides, Paris. Nearly all countries interested in the question were officially represented. The Congress was presided over by Professor Paul Sabatier, Doyen of the Faculty of Sciences at Toulouse, whose catalytic process for the dissociation of molecules in liquids has opened up an apparently inexhaustible field for the production of light oils for motor fuels. The Congress was divided into six sections, devoted to petroleum, schist oils, lignite and peat, tars and benzol, alcohol, and vegetable oils. One of its objects was to fix upon a standard nomenclature for petroleum products and definite systems of analyses, whereby it would be possible for importers and consumers to know exactly what they were selling and using. In view of previous failures to arrive at an international standard, it was soon made clear that the difficulties at present were practically insuperable, and it was decided that the only solution was for each country to appoint a commission to draw up an exact list of the names of petroleum products, and the French commission, which is working in collaboration with a committee already existing at the Ministry of Commerce, will prepare a table in which each product will be classified under its foreign names.

The present situation of liquid fuels was admirably summarized by Professor Daniel Berthelot, who, as President of the Comité Scientifique du Carburant National, has taken an active part in the recent researches for fuels capable of replacing or of being used in conjunction with petrol. The question is not a new one, for it dates back to 1897, when the Ribot Commission published a particularly exhaustive report upon the utilization of alcohol as a fuel. The seriousness of the situation, however, only became manifest during the war, and it has been aggravated since then by the enormously increasing consumption of petroleum oils for marine engines and of petrol for motor cars and aeroplanes, to the extent that at the present rate of increase the whole of the existing supplies of petroleum will be exhausted within sixty years, while long before that time the quantities available will be so far limited that it will be impossible to rely upon them. For the moment there can be no question of diminishing the quantities of petroleum necessary for marine engines and of petrol for aviation; but it is possible to economize petrol for motors and for other uses by mixing it with other hydrocarbons, and eventually there is every prospect of petrol being superseded by synthetic spirit produced from vegetable oils by means of the catalytic process. The mixing of petrol with other hydrocarbons is regarded as a transition stage, until such time as science and industry are able to utilize the solar energy which is being stored daily in vegetable products, and will therefore provide abundant and inexhaustible supplies of fuel.

The hydrogenation process of Bergius has opened up a wide field of equipment and research in the way of producing light oils direct from petroleum by-products and other fuels of low commercial value. Gas oil, heavy oils, tars and asphalt can be transformed by this direct process into motor fuels, and good results have been obtained experimentally with solid fuels of smaller calorific value like peat. The process depends upon the reaction of hydrogen under a pressure of 100 to 200 atmospheres, and at a temperature of 400 degrees Cent. The operation is continuous and

the losses compared with those due to cracking are small, while it appears to be applicable to almost every kind of hydrocarbon product. In Belgium the treatment of bituminous schists by hydrogenation has given excellent results. A considerable amount of experimental work is being carried out with the hydrogenation system, which seems likely to permit of the utilization of vast quantities of products that are at present regarded as of little value, and will consequently add appreciably to the supplies of light oils. Hydrogenation appears to follow the line of development opened up by the discovery of the catalytic process, which itself offers considerable promise in the economical treatment of petroleum, since the molecules are dissociated at atmospheric pressure, so that a much simpler installation than is required by cracking at high pressures can be employed. So far, experiments with catalyzers have been restricted to vegetable oils, but there are obviously great possibilities in the future in the way of obtaining a higher proportion of spirit from the distillation of petroleum oils.

The interest of the Congress, however, was centered not so much in improved methods of distilling light oils from petroleum—which can only palliate the difficulty of diminishing supplies without remedying it—as in providing new sources of liquid fuel. The production of benzol, the hydrogenation of tars and the distillation of lignites and peat are making a notable contribution to the supplies. It was hoped that the enormous reserves of peat would have helped to provide some solution of the fuel problem, but while certain claims are being made in favor of peat, it does not appear as if much is likely to be done, except, perhaps, by its utilization as a fuel for electrical generating plants in the centers of peat production. One such plant is giving satisfactory results in Belgium, and a company in France undertakes to lay down plants for the supply of electrical energy to towns and villages near peat deposits, it being claimed that the cost can be covered by the sale of by-products. It must, nevertheless, be recognized that the exploitation of peat has generally given poor results, on account mainly of the difficulty of drying it. The best method at present discovered is to stack it on shelves with a circulation of air, but as the rapidity of drying depends upon the atmosphere, and considerable areas have to be devoted to the stacking the economy of the operation is an essentially variable factor. It is argued also that peat should be washed to free it from sand, which only complicates the problem. On account of its low calorific value, it does not pay to carry peat over long distances, and, for the moment, it does not appear as if much can be done except by the employment of the fuel on the spot for electrical generating plants. Nevertheless, trials carried out at Arras with a Crossley suction gas plant specially adapted for the burning of peat have emphasized the fact that there are great possibilities in the way of economical running on this fuel.

As the object at the moment is to reduce the petrol consumption in motor cars and for other purposes, so as not to encroach upon the supplies of petroleum and spirit for marine engines and aeroplanes, there are suggestions for making a freer use of suction gas and natural gas, the discoveries of exceptionally rich marsh gas at Vaux, in the Ain, and near Arcachon having raised the question whether the gas cannot be compressed in cylinders and distributed all over the country. Apart from the cost of distribution, which must be heavy, the experience of motor car users with gas under pressure does not encourage the belief that compressed gas will be largely employed for motor vehicles so long as liquid fuels are obtainable. Suction gas is the only practical solution at the moment. The liquefaction of coal gas under a pressure of 300 atmospheres may produce considerable quantities of motor spirit, if it be found commercially advantageous; but this is still in an experimental stage, although there appears to be no doubt that a high-grade motor fuel can be obtained. The commercial success of any process of liquefying coal gas can only be investi-

gated in relation to the interests of other industries associated with coal by-products. Still, the method opens up a new line of research which may eventually result in the complete dissociation of the constituents of coal into various liquid and gaseous fuels at the collieries.

Benzol is at present the only by-product of coal that is capable of being used as a motor fuel, and the quantities available being relatively small, it is clear that if new sources of supply are to be opened up they can only be found in alcohol and vegetable oils. The production of industrial alcohol in France is just one-tenth of the total consumption of petrol. Therefore, the aim of the Comité Scientifique du Carburant National is to encourage the use of a fuel in which there is at least ten per cent of alcohol, preferably with the addition of other home products, such as benzol, until such time as the production of industrial alcohol shall have been so far increased that it will be possible to employ the spirit in engines specially designed to run on alcohol. Legislation in France has limited the human consumption of alcohol to that distilled from grapes and other fruits, the alcohol from beets and similar produce being reserved exclusively for industrial purposes. The object now is to cheapen industrial alcohol as much as possible, as any composite fuel must necessarily be sold at a lower price than petrol. While alcohol mixes perfectly with benzol and provides a fuel in every way as satisfactory as petrol, it does not mix with petrol unless previously dehydrated or by the addition of a dissolvent. Professor Daniel Berthelot stated that the Service of Explosives had discovered a very simple process of dehydration that raised the alcohol to 99.6 degrees and 99.7 degrees. Apparently, this is done by passing alcohol vapor through a column of lime. The method is now being employed commercially, and there is no reason why pure alcohol should not be produced in considerable quantities. Various methods are employed for mixing alcohol at 95 degrees and 96 degrees with petrol, and for the time being this mixture is being used fairly extensively; but the presence of water is objectionable, and alcohol will only become entirely satisfactory as a constituent in composite fuels when the process of almost complete dehydration has been developed sufficiently to allow of its cost being reduced. In any case, it does not appear as if even an agricultural country like France will be able to produce enough alcohol to replace rectified petroleum, and Sir Frederick Nathan, in an interesting communication on the world's resources in fuels, pointed out that in the colonies the scarcity of labor and the cost of transport may stand in the way of cheap supplies to consuming countries. Therefore, we are far from reaching a period when the purely alcohol engine will be necessary, except in centers of production, like the colonies, where alcohol should be obtained at low cost. Meanwhile, the composite fuels can be used in existing engines, and the tests and experiments being carried out aim at determining the most suitable and cheapest mixtures, in which purely national products will enter the most largely. Sir Frederick Nathan mentioned calcium carbide as a source of alcohol on condition of sufficiently cheap motive power to produce it being available. In view of the vast hydraulic installations being carried out, this phase of the question may have some importance in the future.

Now that the difficulties in the way of dehydrating alcohol are being overcome, the problem of utilizing this fuel in motors is practically solved, and its future depends upon legislative measures, and upon an organization which will bring down the cost to the consumer. Nevertheless, the home production can never be sufficient to replace entirely imported mineral oils, even when alcohol is associated with all the other home products that may be available for the making of composite fuels. Therefore, the question arises whether imported oils cannot be replaced by synthetic petrol, and the most interesting feature of the Congress was the proof offered that this is well within the domain of probabilities. Vegetable oils are possible

substitutes for all mineral oil fuels. They have the advantage of being entirely combustible, but, on the other hand, the temperature in the cylinders must be very high completely to burn the acids which would otherwise decompose the lubricating oils. The mere possibility of the acids not being completely neutralized, creates a certain reluctance to employ vegetable oils. Nevertheless, in the colonies these oils would offer an immediate solution of the problem of motor traction, to which Belgian engineers especially have been giving a great deal of attention, and M. R. E. Mathot dealt fully with the progress that has been made with colonial types of engines capable of running on locally produced fuels. The calorific value of vegetable oils is more than half as much again as that of alcohol, but, according to M. Charles, it must be burned at a temperature of 200 degrees to 250 degrees Cent., with a compression of 32 kilos. per square centimeter say, 455 lb. per square inch—for palm oil and the oil of ground nuts. Some of the Belgian engine builders, however, argue that such a high compression is not at all necessary. The inflammation temperature is from 300 degrees to 350 degrees Cent. The oils are suitable for Diesel and hot-bulb engines, but these do not satisfy the requirements of colonial motor traction, which will probably be entirely met by high-speed engines of the Peugeot heavy oil type that has been running on touring cars with extraordinary results from the point of view of efficiency and economy. There was a good deal of discussion on the comparative merits of compressed air and mechanical oil injection, M. Mathot being a partisan of the mechanical system on account of the power absorbed by the air compressor and of the latter being an alleged source of trouble; but the final decision was that mechanical injectors did not give such smooth running in the engine, although they are preferable for moderate powers, especially for colonial engines. Another system of injection proposed consists in a preparatory pulverizing of the oil in the volume of air which enters the cylinder in the form of gas. This is said to permit of the engines running at higher speeds.

The use of vegetable oils as fuel is limited by the cost, which is bound to be fairly high so long as the greater part of the production is absorbed for industrial and commercial purposes. There can only be an extensive use of vegetable oils as engine fuels when the African Colonies undergo a systematic development and improved methods of cultivation ensure a much greater yield of ground nuts, for example, per acre, whereby the cost will be reduced to something like the pre-war figure. The price at which vegetable oils are sold in the consuming countries is out of all proportion to the cost of production, which is something like 15 centimes per liter. A heavy surplus yield would inevitably bring down the selling price to a level that would permit of its being employed as a fuel. Even under present conditions, it appears possible commercially to transform vegetable oils into light oils having the same constituents as petrol. Professor Mailhe, who has been carrying out exhaustive experiments with the catalytic process of Professor Sabatier, showed a number of samples of oil that he had prepared from various vegetable oils.

The process consists in the dissociation of the molecules by means of two catalyzers, one dehydrating and the other dehydrogenating, the nature of the catalyzers varying with the character of the oils. Electrolytic copper is usually a good agent. The reaction is effected under temperatures of 550 degrees to 600 degrees Cent. On passing the catalyzers, the oxygen is separated in the form of water, and a dissociation of molecules leaves the resultant liquid with all the constituents of petroleum. It is then passed over nickel at a temperature of 180 degrees Centigrade when there is a dissociation of hydrogen, producing a good quality of petrol. The petroleum constituents are obtained by a separation of the acid fats which contain everything necessary for the synthetic combination of oils, identi-

cal with all kinds of mineral oils and petrol. The glycerine is removed and sold as a by-product. By the use of suitable catalyzers, benzol, toluene and other products are obtainable, as well as gases which can be added to increase the richness of poor illuminants like water gas.

The extraordinary adaptability of the catalytic process, and the facility with which the molecules of any oils can be dissociated and re-combined to form new products, appear to open up inexhaustible supplies of petrol and other liquid fuels. The only question is whether the process can become commercially successful. Professor Mailhe gave figures based upon estimations showing that there could be no doubt as to the commercial success of the catalytic method. The future, however, depends upon the supplies and cost of vegetable oils, and when the program of colonial development has been carried out sufficiently to ensure adequate quantities of cheap vegetable oils, it will be possible for companies to produce synthetic oils of exactly the same nature as oils from all parts of the world at lower prices than the natural mineral oils. His synthetic experiments led Professor Mailhe to the conclusion that the origin of petroleum oils is due to the building up process of molecules, both animal and vegetable, under exactly the same conditions of chemical reaction and temperature, and the varied nature of the oils is explained by the differences in the chemical reactions to which they are subjected.—*The Engineer*, 27 October, 1922.

CHEMICAL SOCIETY TAKES UP OIL-FUEL PROBLEMS.—To insure future supplies of motor fuels and oils, a special committee of the American Chemical Society has begun the investigation of a series of problems submitted by W. F. Farragher, of Mellon Institute, at the recent meeting of the society in Pittsburgh. The most important of these problems are as follows: Thorough scientific investigation of fractionating columns: rational specifications for petroleum products based on actual research work; the degree of refinement of gasoline for motor fuel; a thorough study of lubrication from a colloid chemical viewpoint; and the chemistry of petroleum hydrocarbons. The work is being directed by the American Petroleum Institute.—*Power*, 31 October, 1922.

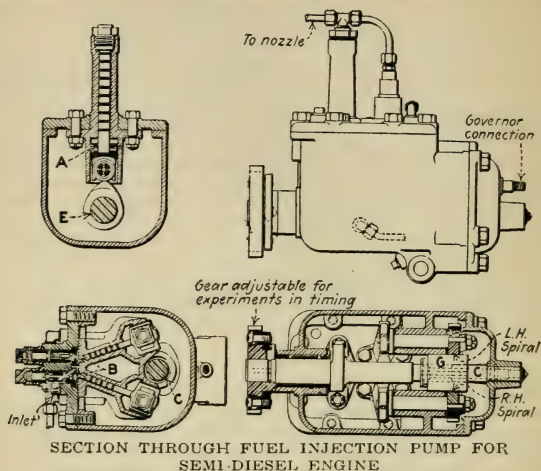
NEW TYPE OF OIL PUMP FOR SEMI-DIESEL ENGINES.—For use with a solid-injection oil engine an injector or oil pump involving new principles has been designed by J. E. Guber, of Chicago. The pump was built for a small two-stroke-cycle engine and has functioned so well that its design is of general interest.

In this injector the liquid is metered in an element which is relieved from the high duty of injection, and the injection element is a second pump, arranged so that the factors ordinarily causing inaccuracy cannot affect the quantity injected. The liquid is drawn into metering chambers *B* by differential pistons during the entire half revolution of the crank, thus allowing maximum time for charging, and the discharge takes place during the other half of the stroke, the liquid passing from the metering chamber into the injection chamber from which its return is prevented by means of a check valve.

This chamber is always filled with oil, and the incoming charge must force the injection plunger *A* back into contact with its cam *E*. The amount of this displacement is exactly that of the charge, as the position of the plunger prior to being displaced was at the point where the injector cam left it after the preceding injection. Thus it is evident that the length of the effective injection stroke cannot be varied by wear, expansion of line or residue pressure, as it is fixed by the size of the charge introduced.

Reference to the accompanying illustration will show that the operation of the metering element is based on the differential principle. Two

plungers work in connected cylinders *BB*. When both plungers move in the same direction at the same time, the maximum quantity of oil is pumped.



SECTION THROUGH FUEL INJECTION PUMP FOR SEMI-DIESEL ENGINE

When they move in opposite directions at the same time, no pumping occurs. Any other relative position of the cranks causes the pumping of a quantity between full and no duty, so that by changing the angular relation of the cranks infinite variations of quantity are obtained. This change is made by sliding the double-cut spiral gear *G* along the drive shaft *C*. As one crank is driven by a right-hand spiral gear meshing with the double-cut spiral gear and the other crank by a left-hand spiral gear, also meshing with the double-cut gear, the sliding of this double-cut gear shifts one crank forward and the other backward. Their relative positions determine the amount of oil forced into the injection chamber. The position of the sliding gear is controlled by the engine governor through a forked lever.

The actual introduction of oil into the engine cylinder is made by means of the cam *E* and the plunger *A*. After the contact between cam and plunger is broken, there is no pressure on the oil in the line. This should eliminate dribbling at the nozzle even after the smallest injection.—*Power*, 31 October, 1922.

DIESEL ENGINES IN LINERS.—London, October 30.—Shipbuilders, almost as much as marine engineers, are keenly interested in the announcement that the Fairfield Shipbuilding & Engineering Company of Glasgow, are to build for the Union Steamship Company of New Zealand a liner six hundred feet in length and of eighteen knots speed, for propulsion by internal combustion engines.

Hitherto it has been accepted, almost as a matter of course, that while Diesel engines of practically all the recognized types had been proved suitable for vessels of moderate sizes and moderate speeds, the time when

they would be used for the propulsion of large liners at high speeds on long voyages was still a considerable way off. In this sphere of work the geared turbine was looked upon as ruling supreme, even though the experience of a good many engineers and owners with that type of machinery has not been particularly happy within the past twelve months. The Diesel engine, it was said, could not yet be manufactured in the necessary high powers, and when high propulsive efficiency had to be obtained by a multiplicity of cylinders driving several shafts the result was much less economical and less satisfactory from the mechanical point of view than the twin-screw, geared turbine.

Now, without warning, there comes the statement that a firm associated in the past with some of the most notable departures in naval architecture and marine engineering are to build and engine a motor-propelled liner that will challenge comparison with the finest, largest, and fastest vessel on the Pacific—and that one of their own construction—and with all the best vessels on the North Atlantic, with the exception of perhaps the first half dozen. There are few of the liners afloat today that can be placed in the same class with the Fairfield-built Canadian Pacific steamer *Empress of Canada*. There may be some larger, and perhaps faster, but there is none in which the machinery department has been carried to a higher degree of efficiency and general perfection.

Yet this is the vessel which the same firm now propose, it is understood, to repeat for other owners, with the enormously important difference that Diesel engines are to be used instead of turbines. The liner which they are to build for the Union Steamship Company of New Zealand is to be of practically the same length as the *Empress of Canada*, and the same speed. As is well known, the *Empress* steamers are the finest vessels in the large fleet of the Canadian Pacific Railway Company, and if it had been announced that that company were to have built a duplicate of their latest, largest, and fastest *Empress* ship for propulsion by Diesel engines, much more would have been said about it than has been said about the contract which has been placed. The announcement would have been received as indicating the beginning of a revolution in marine engineering practice, and the more optimistic among the supporters of internal combustion engines would have been predicting the approaching close of the long reign of the steam engine at sea. But that is exactly what has happened, except for the quite unimportant difference that the new vessel will have other owners.

The revolutionary character of the proposal does not end with this. There are one or two types of marine internal combustion engines which have been more thoroughly tested than others, and with which more extensive experience has been gained. If the suggestion had been put forward that one of these types should be developed still further, and used for the propulsion of large high-speed liners, there would have been, comparatively speaking, less surprise, as the departure would have seemed somewhat natural. But the new vessel is to have engines of the Sulzer type, manufactured at Fairfield under license from the Sulzer firm, of Winterthur, Switzerland. It is no reflection on the type to say that this is not so much a development as a very important departure, and one which indicates very great confidence in the Swiss motor on the part of Fairfield and the Union Steamship Company.

It may be assumed, however, that owners and builders have not taken this step lightly, or without very thorough preliminary investigation. This Fairfield Company have been pioneers in marine engineering all through their long and interesting history, and have always been, in this matter, well ahead of their times. They have been experimenting and investigating with regard to Diesel engines almost ever since these were found to be suitable for the propulsion of seagoing vessels of any size; and that

they are satisfied with the Sulzer type is proved by the fact that they are not starting with small vessels and low powers, but are going at once to 30,000-ton ships with a speed of eighteen knots for service on long-distance routes.

If the Union Steamship Company's vessel proves a success on the run between New Zealand and Vancouver—as she almost certainly will—there can be no reason of an engineering character for the use of steam engines on any liner routes. There may be economic reasons, associated with the cost of fuel and the convenience of fueling stations, but that is another matter. So far as naval architecture and marine engineering are concerned, the new Fairfield contract brings the first-class motor-propelled North Atlantic liner well within sight.—*Boston Evening Transcript* 30 October, 1922.

BIGGEST FLOATING DOCK.—It is officially announced that the contract for Southampton's huge floating dock has been secured by Sir W. G. Armstrong, Whitworth and Company, Limited. This dock which is by far the largest ever projected, will be nearly 1,000 feet in length, and will be able to accommodate even the mighty *Majestic*, the greatest vessel afloat, which has a length of 912 feet and a gross tonnage of 56,000. The building of the dock, which will occupy about eight or nine months, will provide much needed employment for thousands of workers on Tyneside. Upwards of 20,000 tons of steel will be required for the work. The dock will be constructed at the great Armstrong Shipyard at High Walker-on-Tyne.—*Industrial Management*, 19 October, 1922.

WAVE TRANSMISSION OF POWER.—From what was said in our first article it will have been gathered that the wave transmission of power consists in brief of impressing a constant mean pressure on a column of water or other fluid and, on top of it, a rapidly varying periodic pressure giving rise to a continuous train of compressions and rare-factions in the water, the point of generation of the waves being connected to the point at which they are applied by a pipe the length of which is some multiple of half the wave length of the waves generated. In any given case the wave length in feet is expressed by V/n , where V is the velocity of sound in water, approximately 480ft. per second, and n is the speed of the generator—assumed single-acting—in revolutions per second. No great precision in the exact length of the pipe is essential, for not only is there little loss of effective pressure by making it somewhat greater or less than an exact multiple of the half wave length, but, as has been found by experience, the speed of the generator automatically adjusts itself to any moderate variation in the length of the pipe provided the pipe is not unduly short. Further, it is by no means essential that the pipe should have a straight run from the generator to the rock drill or other appliance being driven. The waves pass practically unaffected round bends in the pipe, and in this respect wave transmission permits as much freedom in the run of the pipe as does ordinary hydraulic or compressed air transmission of power.—*The Engineer*, 3 November, 1922.

AERONAUTICS

PILOTLESS ARMY PLANE.—Washington, November 14.—The pilotless army airplane, equipped with an automatic control device said to be more accurate and dependable than any human pilot, has been developed to a point where it has made successful flights of more than ninety miles, it was announced today by the Army Air Service.

In the long series of tests just concluded the machine used was one of the small types having a span of only twenty feet, a sixty horse-

power motor, capable of carrying a useful load of 250 pounds, equipped with an automatic pilot which takes it off the ground, levels off at any predetermined height and will rise to unusual heights. Except for natural deviations of flight due to unfavorable air currents, the control machinery holds fast to its course for the limit of its gas supply, which, in the equipment of the experimental aircraft makes possible a sustained flight of two and a half hours.

According to the statement, the most successful of the pilotless planes is that operated by gyroscopes.—*Baltimore Sun*, 15 November, 1922.

NEW FRENCH PLANE.—An all-metal battle plane, mounting one French seventy-five field gun, was delivered to the French Government October 15.

The plane is driven by four motors of 400 horsepower each. It weighs more than ten tons. Its speed is more than 100 miles an hour. It is a night bombardment plane, capable of carrying several tons of bombs in addition to two pilots, a mechanic and a gun crew. A field gun has been specially mounted on it. The plane can carry fifty shells if necessary. It already has passed the builder's trials, but has not yet begun the Government's trials.—*Aerial Age*, November, 1922.

LIGHTHOUSE FOR NAVY PILOTS.—A special light for air stations has been put into operation at the Naval Air Station at Hampton Roads, Va. This is a 6,000 candle power white light, flashing every three and one-third seconds. It has an elevation of sixty-five feet above mean high water and is visible twenty miles horizontally. The rays from this light diminish in intensity toward the zenith. This feature of construction is necessary in order that an approaching aviator will not be blinded by the upper rays when close to the light.

This aerial beacon is operated by acetylene and functions automatically. It is controlled by a "sun valve," which works on the theormostatic principle. During daylight hours the valve is expanded by absorbed light rays and the main light is extinguished. After dark the valve contracts and allows the light to start functioning. A small pilot light is kept burning continuously for the purpose of lighting the main flame.

The object of this light is as a guide to aerial observation and to aid in locating the Naval Air Station.—*Aerial Age*, November, 1922.

THE U. S. NAVY AIRSHIP MOORING MAST.—There has just been completed by the Navy at Lakehurst, N. J., the tallest airship mooring mast yet built, and the first to be constructed without any wires.

It consists of (1) foundation for tower, machinery and snatch block anchorages; (2) a triangular steel tower 165 feet high, with three platforms, passenger elevator, pipe lines for gas, fuel, oil and water, electric lighting for night operation, telephone and voice tube systems; (3) the mooring gear at the top; and (4) the mooring gear at the bottom.

In appearance it is much like a great radio tower which, more than anything else, quickly distinguishes it from its foreign ancestors, standing on its three great legs at the vertices of an equilateral triangle.

At the base of the tower is a building for housing four officers and twenty men, forming the landing crew; an office elevator entrance, one main and two auxiliary winches for the lines used in bringing the ship to the mast, together with the pumps for water, fuel and oil.

The elevator runs in an interior rectangular framework to a platform 136 feet above the ground. From this a ladder extends 12 feet upward to the main operating platform; at 160 feet altitude is the third platform and the gimbal of the upper mooring device proper.

Up the tower leads a pipe line for delivering 18,000 lb. of water in an hour. Fuel is pumped at 1,500 gal. in the same time. A 12-inch pipe with fabric tube to the ship supplies 300,000 cubic feet of hydrogen or helium gas an hour under one inch pressure.

On the extreme upper platform is the gear for receiving and securing the ship, together with the connections for the water, gasoline, oil and gas piping which couple on to the ship's lines.

Surrounding the tower is a circle of forty-eight snatch block anchorages at equal intervals. The diameter of this circle is 1,000 feet. Each anchorage has a heavy U bolt for taking a snatch block. There are also provided additional anchorages for snatch blocks or fair lead sheaves to make it possible to lead two lines from any two of the guy line snatch blocks 120 degrees apart to the two auxiliary winches in such a direction as to feed properly.

In docking, a ship is brought into the wind and approaches the mast. At a convenient distance her main hauling line is let go through the ship's cone. This line is then coupled on by the crew to a main hauling line which runs from the main winch, up the tower, and has been dropped from the cup at the top of the mast to the ground where it meets the ship's line. The slack is then taken up by the main winch and the ship is gradually pulled toward the head of the mast by electric power.

After this hauling-in has begun, and when the bow of the ship is near the circle of snatch block anchorages, two guy lines are dropped from the cone of the ship and coupled on to corresponding lines from the auxiliary winches. These lines lead from the winches in the base of the tower to the snatch blocks which are at sixty degrees on either side of the direction of the wind, through such fair lead sheaves as may be necessary to make the lines feed properly on the winches, also operated by electricity. These latter are run until a mark on each line appears at the corresponding snatch block, when the auxiliary winches are stopped, the lines then being simply held. At this point there is just sufficient line between the snatch blocks and the ship's bow so that the ship's cone can be brought into the cup on the ram of the mooring gear at the top of the mast.

The main hauling line continues to draw the ship forward and down until the ship's cone enters the revolving cup.

Hauling is then continued at reduced speed while the spring in the ram is compressed until the ram has entered the outer tube, a distance of about 5 feet, when it latches itself in the "in" position. The main hauling winch is then stopped. With the ship attached to the revolving cup and the ram in the "in" position the hand winches on the main platform are manned and the ram brought to a vertical position by the centering lines. Rod stays are then put in place and tightened up, fixing the ram and tube in this vertical position. The centering lines are then slacked off and the ship rides to the structure of the mast alone.

The two guy lines are released from their winches and the ship's portions withdrawn into the ship. The ship then overhauls the main hauling line, withdrawing it up the mast and into the body of the ship until the coupling to the winch appears on the operating platform. Hauling is stopped and the winch line is secured so that it cannot fall down the mast when the coupling is broken. A light line is then attached to the ship's half coupling and the hauling line completely withdrawn into the ship.

The passengers, baggage, armament or freight may then pass over a gangway let down from the bow of the ship to the main platform of the tower where it rests on a portable pad to prevent chafing.

In leaving the mast, the ship is trimmed sufficiently light to rise as soon as it is released from the mast, the releasing hook is opened, the

ship rises and the mast is again ready to receive.—*Aviation*, 13 November, 1922.

PLANE TAKES OFF AND ALIGHTS ON U. S. S. "LANGLEY."—For the first time in the history of the American navy an airplane has taken off from the deck of a ship and after flying fifty miles alighted again on the same. This momentous event happened on October 26, when the United States aircraft carrier *Langley* was cruising off Cape Henry, on the Virginia coast. The aircraft used for this experiment, a land-type two-seater airplane, *A606*, was piloted by Lieutenant Commander Godfrey deC. Chevalier, U. S. N., one of the earliest American naval aviators.

The take-off was made without the use of the launching catapult, the plane hopping off the 500 feet deck of the *Langley* as from an airdrome. On the return from the fifty-mile flight the plane met the *Langley* steaming at a speed of six knots and landed on the deck in the receiving gear. A thirty-mile wind was blowing from the northwest at the time, and the plane, landing at a speed of forty-five m.p.h., was stopped by the arresting gear developed for this purpose after a run of only 25 feet.—*Aviation*, 6 November, 1922.

TORPEDO AND BOMBING MANEUVERS.—On Thursday, October 12, 1922, Torpedo and Bombing Plane Squadron 2, conducted bombing practice. The weather conditions were excellent and a squadron formation of six *F5L*'s bombed from an altitude of 8,000 feet. One salvo of twelve 230-lb. bombs was dropped and a perfect straddle was obtained, with six splashes on either side of the battleship target, the mean point of impact being about 200 feet forward of the center of the target.

Observation Plane Squadron 2 completed the same practice on October 6, 1922, this squadron bombing from 6,000 feet and obtained six direct hits out of twelve bombs dropped.

The results from both practices, indicate that with increased practice it is quite possible to bomb accurately from altitudes of 6,000 feet and above.—*Aviation*, 6 November, 1922.

SILENCING OF AIRCRAFT.—The good results of silencing are obvious. These are set forth.

As airplanes, for example, can be heard from a great distance, long before they can be seen, listening devices which show location and distance enable the enemy to be forewarned and prepared. By muffling, machines can get nearer the enemy before being perceived and carry out their work at a lower altitude and with greater surety. At night, the advantage is probably increased.

The pilot and observer can carry on conversation without the use of signals or telephones.

By the use of a cut-out, signals can be made from one machine to another in formation flying. Signals may be made to the aerodrome.

The noise of the engine is an obstacle in radio communication.

The noise of an unmuffled engine has an undesirable effect on the pilot's system.

The noise caused by an airplane arises chiefly from two sources. These are: first, the noise of the exhaust gas leaving the engine. Second, the whirr of the propeller. Since the noise of the engine is much greater than that of the propeller, if we can deaden it, or do away with it altogether, we have done, perhaps, all that is necessary.

From a military point of view, it is necessary for the machine to fly absolutely without noise, either from the engine or from the propeller.

The simplest method of reducing the noise of the propeller is to reduce its speed of rotation.

It has, however, been proved that during a glide the noise is no longer audible from the ground, even when the machine is at an altitude of but 500 to 700 meters and the propeller is turning at 500 to 700 r.p.m. There is thus no doubt that the combined use of a geared propeller and a silencer adapted to the engine provides an almost perfect solution of the problem of the silent airplane.

In Switzerland there has been developed the "*Ad Astra*" silencer, a note on which was published in *Aerial Age* of January 2, 1922. An observer reported: "There was scarcely any noise from the airplane during flight. At an altitude of 1,000 m. only, the propeller was heard. Other machines were up at the same time, and the difference between them and the one fitted with the silencer was striking. According to the data given by those checking the tests, there was neither loss of engine power, nor greater heating. It was even found that there was economy of fuel. The silencer can easily be placed in a suitable housing on the plane so that there will be no increase in head resistance."

The requirements of a muffler may be summed up as follows:

There should be no objectionable loss of power. In tests of certain mufflers by the University of Michigan a loss of less than one per cent was shown.

There should be a saving of fuel.

Better cooling of cylinder walls should be obtained.

Cleanliness of spark plugs and valves.

Exhaust gas should be thoroughly cooled as it leaves to avoid the present danger of fire.

The muffler must be capable of being easily incorporated in the design of the aircraft.

The weight of the device should not be prohibitive. For 250 horsepower it should not weigh more than 20-25 pounds.

Shape must be favorable for the reduction of head resistance.

Quick detachability is desired.

Those concerned in this work will be interested in Reports nos. 10 of 1916 and 55 of 1920, of the National Advisory Committee for Aeronautics, Washington, D. C., which reports cover the only work officially done in mufflers in this country, so far as is known. In these experiments a seventy-five per cent reduction in exhaust noise was found certain of easy acquirement.—*Aerial Age*, November, 1922.

2,000-MILE NON-STOP FLIGHT.—Lieutenants John A. Macready and Oakley G. Kelly, Air Service, beat all previous performances in non-stop flight on October 3-4, when they piloted the Army-Fokker monoplane T₂ from Rockwell Field, San Diego, Cal., to Schoen Field, Fort Benjamin Harrison, Ind., an airline distance of 2,060 miles which they covered in 27 hr. 56 min.

The flight was undertaken with a view of making a non-stop flight from the Pacific to the Atlantic—the terminus chosen being Mitchel Field, L. I. A leaking radiator unfortunately prevented the two pilots from carrying out their project, adding greatly to their difficulties, caused by violent storms which were encountered over the Rockies.

The longest previous non-stop flight between two points was the crossing of the Atlantic made by John Alcock and Arthur W. Brown on a Vickers Vimy bomber, on June 14, 1919, the distance being 1,930 miles.—*Aviation*, 13 November, 1922.

ARMY BOMBING TESTS.—Washington, November 7.—Brig.-Gen. William Mitchell, assistant chief of the Army Air Service, announced today on arrival from the bombing tests held yesterday in Hampton Roads that protection of America's coasts now depended upon the nation's air forces, backed by a good army. Air bombers, he said, had supplanted coast artillerymen as a protective military weapon, adding that the demonstration yesterday totally eclipsed anything ever before attempted by aviators from a standpoint of accuracy in bombing and potential defense strength of aircraft.

"Five *Martin* bombers, loaded with full equipment, including four 300-pound dummy bombs to the ship, bombed two targets under towage from a height of between 3,200 feet to 3,700 feet," General Mitchell said, "and every bomb dropped was effective, possibly with one exception. The accuracy of this fire is without parallel, especially since the targets were only twenty feet by twenty feet in size, and the aviators themselves had been under instruction only for a short time."

General Mitchell declared it was possible now to protect the Atlantic coast from Chesapeake Bay to Boston with "a couple of pursuit groups of aircraft."—*Baltimore Sun*, 8 November, 1922.

ORDNANCE

AIR TARGET PRACTICE BY ARMY.—Big guns at Fort Story will open up tomorrow on moving targets fifteen miles at sea, in the joint army and air service maneuvers which have been in progress in Hampton Roads for a week. Airplanes will observe the fire from the big guns.

The guns in service at the Fort Story practice will be the railroad howitzers, among the largest of this kind which have ever been in practice in this territory.

The Fortress Monroe air batteries were scheduled to fire today at targets trailed in the air from airplanes, the most dangerous target practice undertaken by the service. Rain interfered, however. It will be carried on tomorrow if the weather clears.

In the firing at trailing targets airplanes will drag them at a distance of about half a mile a certain type of kite balloon. The targets can be released after being hit and the effect of the fire ascertained.—*Baltimore Sun*, 8 November, 1922.

RADIO AND NAVIGATION

LARGE VACUUM TUBE.—The General Electric Company has just announced the production of a 1,000 kilowatt or 1,000,000-watt vacuum tube. Such an output is the equivalent of approximately 1,300 horsepower. For several years research work on vacuum tubes has been done in both the Western Electric Company laboratories and in the General Electric Company laboratories at Schenectady. Last year the General Electric Company startled the world with the announcement of the production of a twenty-kilowatt tube. Then came the announcement from the Western Electric Company's engineers that they had developed a tube capable of handling 1,000 kilowatts of electric energy. Now comes the announcement from the General Electric Company of the realization of a 1,000-kilowatt "supertube," from which we can glean the fact that it is now not so much a problem of manufacturing the tube as it is devising a means of furnishing the necessary power to operate it.

The General Electric Company's latest accomplishment is not the same type of vacuum as the one popularly known in use with radio sets. It is not a three-element tube consisting of a plate, grid and filament, but a tube in which there is only a plate and filament on the inside. In detail,

the plate is not sealed in a glass tube, as is done in the smaller sizes of vacuum tubes in present use, but this plate actually makes up the tube. It is cylindrical in form, thirty inches long and one and three-quarters at a rather high frequency of ten thousand cycles a second, and under these conditions the exciting current is one thousand eight hundred amperes. The actual power input of the filament is twenty kilowatts. In other words, twenty per cent of the output is the amount of energy thrown away in the filament. This energy is required solely for the purpose of producing electrons. The current heats the tungsten filament and boils out these little carriers.

This new tube promises to bear out the prediction of Mr. A. W. Hull, in that it will ultimately enable the power engineer to control vast amounts of power with comparatively little effort. In the near future, power transmission will very probably be accomplished by the use of direct currents instead of alternating currents. Large vacuum tubes will be used to change the alternating current of a generating station to direct current, after transformers have raised the generated voltage to a high value, let us say, for example, to two hundred fifty thousand volts. This energy will be transmitted over long lines with comparatively little loss compared to that which would occur on the same line were it used to transmit alternating current. At the distant end, this voltage will be impressed on other large vacuum tubes so connected as to transform the high voltage direct current to an oscillating or alternating current. This alternating current will then be run through transformers, where its voltage will be reduced to that ordinarily used for city transmission for lighting and local power purposes.—*Boston Transcript*, 14 November, 1922.

SUMMARY OF ACTIVITIES OF RADIO COMPASS STATIONS.—There has been instituted a standard report form covering the activities of all radio compass stations, which indicates the amount of service rendered by the stations and other important points.

It is interesting to note the service rendered by the stations in the fifth naval district during the month of January.

Cape Hatteras handled 1,403 bearings. There was an average of 1,038 bearings furnished by each station in the fifth naval district. This is the largest number of bearings ever furnished by any district organization since the inception of the radio compass service.

It is also interesting to note that a total of 11,650 bearings was furnished in an average time of 3.6 minutes.

The February report shows a slight decrease in the amount of service rendered, which is probably due to better weather conditions.—*Engineering Bulletin*, No. 3, 1 August, 1922.

NEW ELECTRIC SUBMERGED LOG.—The disadvantages of mechanical and hydraulic logs have been eliminated in the electric submerged log invented by Captain B. Chernikeeff, formerly hydrographer of the Russian Navy. This log registers accurately at all speeds, sets up no detrimental or variable friction, and can be readily drawn inboard for inspection. It consists of an electro-mechanical device fitted to the hull of a ship at a pre-determined depth and at a point where wave and propeller disturbances do not occur. Detrimental friction being eliminated, the log is supersensitive.

There is no packing about the rotator shaft, and the remaining resistance to the rotation of the shaft is constant and practically infinitesimal at all speeds. A single ball-thrust bearing, submerged in oil, is employed, and brush friction at the electrical contacts is cut down to a negligible quantity by the use of a worm gear reduction in the ratio of 225 to 1.

In connection with the log a recording apparatus and table of speeds are provided which can be installed in any part of the ship. A buzzer is also used for determining the speed of the vessel. This buzzer gives an audible signal every twentieth of a mile traversed, and with the aid of a stop-watch the actual speed can be ascertained. The energy consumption of the complete installation is quite low, a six-volt battery being used which is sufficient for a 50,000 mile run. The battery is of the dry cell type and requires no attention.

The accuracy of this log has been brought down to a fraction of a foot per mile regardless of the speed of the ship. This has been accomplished even when the speed was as low as three miles per hour. Navigators have been accustomed to charge all errors of the log to currents, and have endeavored to check the log by the revolutions of the propeller, but rough weather will upset all these calculations, and this is the time when it is most important that the log be accurate. With the electric submerged log no correction for errors is necessary no matter what the speed of the ship may be. Other advantages of this log are as follows: the distance actually traveled by the vessel in maneuvering as well as when traveling on a straight course is recorded; when the vessel is at anchor the speed of tidal or other currents is accurately measured; the log operates satisfactorily when the ship is going astern; the apparatus can be installed without placing the vessel into drydock.

The Chernikeeff device is being put on the market by the Electric Submerged Log Company of 33-35 Eastcheap, London.—*The Nautical Gazette*, 11 November, 1922.

NAVIGATION BY GYRO-COMPASSES—The Admiralty, in directing attention to the growing importance of the gyro-compass in the navigation of the modern ship, emphasizes the necessity of a thorough working knowledge by those responsible for the efficiency of gyro installations. It has been ascertained that a certain number of senior navigating officers have not yet been through a course of gyro-compasses. Every officer who has qualified in navigation for first class ships and has not been through a course should take an early opportunity of applying for one, and officers who have already received gyro instruction should apply for refresher courses at intervals of every three years in order to keep abreast with the latest developments. Courses consist of ten working days, and officers serving afloat should arrange the date of their applications to fit in with the period of refit of their ships.—*Army, Navy, and Air Force Gazette*, 21 October, 1922.

THE MARIMETER.—The marimeter is undoubtedly an instrument of tremendous possibilities. A button is pressed, a small hammer strikes a plate in the bottom of the ship and at that instant, by means of the sound waves, the machine records the precise time from the origin of the sound to the return of the echo, starting and stopping automatically. The dial, gauged to fathoms, shows the depth under the keel almost instantly. Of course the speed of sound in water is known, a mean value of 4,800 feet per second being used.

With the marimeter four soundings may be taken per minute. This too, from a station in the chart room, or wheel house. An anxious navigator, bending over his chart at night, may press the button on his sounding apparatus, and know the depth as soon as the sound waves have time to descend and bump back again in the form of an echo.

The speed of the vessel from which soundings are taken introduces no appreciable error because its speed, in all cases, is small in comparison with the speed of sound in sea water.

The writer can imagine no safer ship than one fitted with radio, with competent wide awake operators, a radio direction finder, a gyro-compass, and a "Metal Mike" steerer. Then, to top off, a beautiful brass marimeter in the chartroom. Clear view screens on the bridge, spinning away the salt drift before the eyes of the officer on watch. Below, of course, there would be a submarine signal apparatus. Add all of these things together and balance them against the value of the lives on a modern liner, not to mention the ship and cargo, and then wonder why all ships are not being equipped with these things as fast as they come out.

One other thing, which would cost nothing, and might save a lot of money both in construction and in upkeep—have the bridge designed by a sailor and not a naval architect.—*The Nautical Gazette*, 18 November, 1922.

MISCELLANEOUS

FRANCE AND THE NAVAL TREATY.—The Washington Conference demonstrated that Americans at large are prone to consider France's requirements respecting sea power as of comparatively minor importance. No justification from any broad viewpoint can be found for such opinion.

France is the greatest political entity on the continent of Europe. Among the colonial empires of the world the French is second in relative size and population. The perpetuation of our civilization depends upon the survival of no nation more than upon France. Both her economic life and her political life have such a fundamental basis in sea power that an acceptance of the Washington treaties, which relegate France to a third rate naval power, would seriously impair the probability of her survival as a great nation.

It is true that France is burdened with the obvious vital necessity of maintaining herself as a great military power. Her armies today are the greatest stabilizing influence that exists against chaos all over Europe. Moreover, her old problem of the land defense of France itself against numerically stronger hostile armies gives every promise of frequent recurrence in the future. But these land conditions of military necessity do not lessen the importance of sea power to France. Quite the contrary, they enhance it.

During the late war 1,000,000 soldiers were added to the French army from French colonies. The early transport of large numbers of troops from northern Africa across the Mediterranean to France was an important element in the initial grand strategy of the main armies in 1914. Notwithstanding the great naval preponderance of the joint Anglo-French naval forces in the Mediterranean, a raid by the German battle cruiser *Goeben* seriously interfered with and delayed the troop movements from Africa and hampered the Allies correspondingly in the Marne campaign. Could the Germans have established sea control of the Mediterranean, Joffre would have been denied many thousands of troops at a time when the balance of victory could be decided by a few battalions.

A broad survey of the earlier years of the World War discloses France holding her own very precariously, even with the assistance of the British and Russian armies and of 1,000,000 French colonial troops.

It took 2,000,000 Americans landed in France to turn the tide after Russia dropped out of the war. What, then, of future prospects? Russia must be eliminated for many decades. Hostility between England and France has grown into the outstanding feature of current European politics. Italy follows the British lead. America is far away and requires a long time to be aroused to warlike action. Except for those million or more colonial troops which must come from overseas France has no reasonable hope of reinforcements against the day when German

hordes may return. In such circumstances France will surely collapse unless the French Navy can assure the passage of the colonial troops across salt water. Sea power means this to France, and more also.

FRANCE'S GREAT COLONIES

French colonial possessions are of a magnitude exceeded only by British. Their total area is nearly twenty per cent greater than that of the United States proper, while they are populated by about 50,000,000 persons. They furnish splendid opportunity for France to regain slowly some of the thirty per cent of her capital wealth lost in the late war. The building up of a large trade with her colonies under present conditions is a vital economic necessity, which cannot be met with sufficient certainty except under the protection of an adequate navy.

Considering France's fundamental need for adequate sea power to safeguard both her economic life and land power it is hardly surprising that the French resented bitterly the low place accorded by the Washington Conference to their navy relative to other great powers, especially Britain.

The capital ship ratio between Britain and France of 5 to 1.75 prescribed by the Washington treaty will prevent France from utilizing colonial troops should the present strong and increasing tendency of quantities of munitions required in modern war that France must import from overseas.

WHY FRANCE NEEDS SEA POWER

A hostile England means the death-knell of France, unless the latter can exert some substantial maritime restraint upon the former. Even in the event of England's being her only opponent, France would be at a tremendous disadvantage in the absence of substantial sea power, since she would have to bear a smothering economic blockade and would face the certain loss of her immense colonial empire.

The principal reason advanced for holding France to such a low ratio in capital ship tonnage was that the status quo basis for limitation was the most equitable, and the only one upon which the general agreement could be reached. In the main, these reasons are logical, but there is another side of the question which in French eyes warrants special consideration being given her.

The naval status quo in 1922 was markedly abnormal in France's case. Until the advent of Germany as a great naval power the inherent need for some substantial balance to British sea preponderance had made it necessary for France to maintain a fleet approaching the British in strength. This had been the normal condition for several hundred years. The sudden elimination of the German fleet recreated the old underlying conditions before the French Navy could be built up to normalcy. The basis of limitation for sea power should take into account not only the existing but also the normal status quo if the greater danger incident to unbalanced power in Europe is to be avoided.

LOSS MAY BE PERMANENT

With still less justice, the fact that France cannot now afford extensive building of capital ships has been given as a reason for assigning her a low ratio, which bids fair to become permanent. In any future conference the principle of the status quo almost certainly will be the basis for limitation. Hence the relative strengths fixed by the Washington Conference, if accepted now, will have a strong tendency to become permanent. Under these circumstances France may never be able to recover her appropriate position on the sea, even if improved finances or other

opportunities, such as a sudden radical change in the conventional characteristics of the capital ship, should present itself. France is poor now, she may be rich ten years hence. One of the most important requisites for the recovery of her wealth is sea power. How illogical to cite her present poverty as a reason for denying her the opportunity to recoup her fortunes!

But the French have an even greater objection to the Washington treaties than the low capital ship ratio assigned France. The so-called Root code respecting the employment of submarines would draw the fangs even of such very limited naval power as remains to France. Moreover, French distaste for this code is heightened by the fact of its adoption having been apparently accomplished largely through what they believe to be a diplomatic trick.

The code intends to deny to submarines the rights universally conceded to other types of naval vessels in conducting war against commerce. Even though the submarine should scrupulously adhere to every requirement of international law and custom, still she would be forbidden to molest enemy commerce. This under the assumption that it is practically impossible to use submarines against commerce without ruthlessness as practiced by the Germans. Such an assumption entirely ignores the numerous cases in the late war of the capture of merchant vessels by German and Allied submarines in a manner strictly in accord with methods employed by surface vessels and sanctioned for many centuries. It ignores the inevitable development now in progress to submarines of large type which will have even less difficulty in adhering to methods recognized as entirely legitimate. To deny France the right to use submarines in a regular way against British commerce is to remove wholly any substantial restraint in Europe against the abuse of sea power by the British for the next ten years at least.

The use of French submarines against British commerce would amount to little else than a restraining influence upon Britain. The experience gained by the British Navy during the late war, combined with the great strides that have been and are being made in anti-submarine devices and methods, would prevent a French submarine campaign from starving the population or industries of Great Britain. Such campaign would not operate to free France from an economic blockade. British cruisers would continue to starve France much more effectively than Britain could be starved. Under these conditions the justice of denying France her only means of defense against British aggression at sea is difficult to admit. France could hardly be blamed for refusing to give up the right thus to defend herself.

In addition to the inherent justice which seems to support the French view, their disinclination to accept the new submarine code is influenced by what they consider the objectionable British tactics at the conference. Through a considerable period of the conference discussions the British repeatedly implied that the French subscribed to the principle of ruthless submarining. The French delegation was led into frequent emphatic denial of such implication. Finally the British misquoted a published article by an officer of the French naval staff, ascribing to the writer sentiments quoted by him as being German. Apparently the French delegates failed to detect the discrepancy until after the delay incident to mailing the article all the way from Paris, and thereafter British parliamentary tactics prevented the French from announcing the error until too late to derive any psychological benefit therefrom.

Meantime the negotiations in framing the submarine code had progressed too far for the French to withdraw their acquiescence. Throughout this incident the French were subjected to a propaganda in the

American press so hostile as to cause an official protest from their delegation, which knew that the whole matter of giving information to the American press during the conference had been placed in the hands of the British publicity agent. All of this remains in the French mind as an influence against adoption of the Washington treaties.

Other important aspects of these treaties operate to the disadvantage of France as compared with England. The proposed abolition of gas warfare would largely nullify the advantage conferred on France by the advent of air power. Paris is almost twice as far from the English coast as London is from French coastal territory. The threat of a gas attack from the air upon London and other great English centers of population might bring Britain to terms in spite of preponderant naval power.

OTHER DISADVANTAGES CITED

The proposal to refrain from further fortification and development of Pacific naval bases will prevent a proper defense by France of her extensive possessions in that region. The British have a system of admirably placed and well equipped naval bases which insure a safe and speedy passage of their fleet from Europe to Singapore and Australia, thus greatly reducing the handicap of limited base facilities in the Pacific itself.

France has nothing comparable to this. The existing grip of British upon Chinese commerce and resources will be perpetuated from the fact of the Nine-Power Treaty not being retroactive. Hence France will not enjoy opportunity with Britain in the rich Chinese markets if this treaty is ratified.

Finally, an acceptance of the Washington treaties will prevent France from finding a balance in Europe to British naval preponderance, even by the time-honored custom of alliances. Italy is the only other European power possessing any considerable navy, and she also is limited to a 1.75 ratio. France and Italy combined could muster a ratio of only 3.5 compared with Britain's 5. European naval power is thus hopelessly unbalanced, a condition never paralleled except at short intervals for many centuries.

It is only human that France, whose greatness is so dependent upon sea power, should want to keep the right to match England in capital ships, should future events render it desirable; and that France should hesitate about abolishing submarine and gas warfare, which will constitute her only possible restraint against British naval aggression until she can afford to compete in capital ships. These are the principal influences at work toward an adverse decision by France respecting the "Great Experiment" embodied in the Washington treaties.—Captain Dudley W. Knox, U. S. N. Retired, in *The Army and Navy Journal*, 11 November, 1922.

IS THE WASHINGTON AGREEMENT IN DANGER?—Is the non-ratification of the Naval Limitation Treaty by one or more of the five signatory Powers a contingency sufficiently probable to justify an examination of the consequences which might ensue therefrom? A survey of French comment on the treaty and of recent statements by prominent French naval officers suggests an affirmative answer. The fruits of the Washington Conference in respect to naval disarmament have never aroused enthusiasm in France. It is felt that her just claims were brutally disregarded, that, in the words of Admiral Favereau, "the Conference marked a triumph of selfish interest on the part of the three dominant naval Powers," and above all that those responsible for drawing up the Limitation Treaty completely failed, either from ignorance or set purpose, to show France that consideration to which she was entitled by virtue of her traditional

rank as a maritime state and her far-reaching requirements of sea defense.

It is asserted that the French naval delegates were unanimously against the leading clauses of the treaty and only withdrew their opposition in deference to the wishes of their diplomatic chiefs. Since then the treaty has been scrutinized with painful care by every Frenchman who is concerned for the maritime future of his country, and without exception they reject it as incompatible with her minimum needs in the naval sphere. Nor is the treaty any more popular with French statesmen, who find in it a formal renunciation of more than one fundamental principle of national policy. Both in the Chamber of Deputies and the Senate there is said to be a strong movement against ratification, though when the actual decision has to be made these bodies are expected to take their cue from the Government, and there is no reason to suppose that M. Poincaré and his colleagues are blind to the gravity of the issue which would be raised were the treaty to be repudiated by them.

It is evident from inquiries made in competent American circles that failure to ratify the document by any one of the parties involved would render it a dead letter so far as the United States was concerned. One American authority whom I recently consulted was explicit on this point. "If the treaty is turned down either by France or Italy, it will at once go into the waste-paper basket," he said. "An instrument of this kind must be binding on all or none. For two or three Powers to restrict themselves to a certain standard of relative naval strength while one or two other Powers remained at liberty to expand their fleets as much as they desired would be contrary to reason. If, therefore, the treaty is not ratified all round, you may take it that the whole of our original program will be revived and carried into execution."

This means that the United States would resume work on the seven battleships and the six battle cruisers which were to have been cancelled under the treaty. In that event Japan, of course, would resuscitate her own program, which comprised fourteen capital ships. She would complete the *Kaga* and *Tosa*, on which no work has been done since they were launched nearly a year ago; she would abandon the scheme of converting the *Amagi* and *Akagi* into aircraft-carriers and proceed to build them to the original design as 43,000-ton battle cruisers, besides relaying the keels of the *Atago* and *Takao*, of similar type, on which all work was suspended last December; and she would make preparations for laying down in due season the other four battleships and four battle cruisers which had been authorized by the 1920 program. Moreover, these enormous reinforcements to the American and Japanese battle fleets would involve a proportionate increase in the auxiliary establishments of both, so that many additional cruisers, torpedo craft etc., would have to be legislated for.

To estimate the effect of this renewed shipbuilding on British policy we need only hark back to the position as it stood before the Washington Conference was convened. At that time we were committed to the building of four 47,000-ton battle cruisers, which were obviously but the first instalment of the huge program that would eventually have had to be undertaken in order to maintain the one-Power standard. If the Limitation Treaty went by the board these four ships would have to be restored immediately, and arrangements made for building at least ten additional vessels of the largest type in the course of the next five years, together with many more cruisers, destroyers, and other ancillary craft. We should also have to restore the personnel to the figure at which it stood before the "axe" got to work, set aside millions for the construction of docks to accommodate our new leviathans, and generally resign ourselves

to years of naval expenditure on a lavish scale. All of this would be absolutely unavoidable if the limitation agreement broke down and we were still resolved to maintain bare equality with the United States Navy.

It is therefore devoutly to be hoped that French dissatisfaction with the treaty will not be carried to the length of repudiating it. The French point of view, which has been explained to me on high authority, is by no means unreasonable. "It is not that we object to the restriction of battleship construction for a short term of years," said my informant, "since France in any case is not yet able to afford new capital ships. Our protest is against the cool assumption expressed in the treaty that France must forever remain a third-rate naval Power, that she is entitled to no greater measure of sea power than Italy, and that her maritime interests are so much inferior to those of Japan—conclusions which are flatly at variance with present-day facts and the teachings of history. With our long but divided coastline fronting two seas, the Mediterranean and the Atlantic, in both of which the freedom of our communications in war time would be for us a question of life and death; with our great colonial Empire and our far from insignificant merchant marine, a powerful navy is more of a necessity to us than to Italy.

"The fundamental error committed by the authors of the treaty lay in taking the world's fleets of 1921 as the standard of relative strength to be observed in the future. The position in 1921 was, in fact, quite artificial. The French Navy had been unable to make good any of its war losses because the dockyards were too busily engaged in fabricating military material. Thus for seven years the navy had been in a state of arrested development, every war casualty representing an irreplaceable loss, whilst in the same period America and Japan, and Britain to a lesser degree, had been steadily adding to their naval resources. Consequently the post-war year of 1921 found our fleet abnormally weak, and now we are invited to keep it in that feeble condition for an indefinite term of years, whilst other fleets, which were inferior to ours before the war, are to be guaranteed a perpetual ascendancy. For France the only acceptable ratio of sea power would be a ratio based on the relative standing of the world's navies in 1914, and it is in that sense that we are anxious to secure a revision of the treaty which was hastily concluded at Washington. France yields to none in her desire for peace and disarmament, but she is not prepared to conclude offhandedly an arrangement which is so demonstrably unfair and so prejudicial to her future."

It remains, however, for Frenchmen to ask themselves whether their country would really benefit in the end if the naval limitation scheme were shipwrecked. Since in the building competition that would inevitably follow the French Navy must be left further behind than ever, it would eventually occupy a position much lower than the treaty assigns to it, and France herself, by her action in starting afresh the old and ruinous rivalry in naval armaments, would not enlarge her circle of friends abroad.—Hector C. Bywater in the *Naval and Military Record*, 18 October, 1922.

TORPEDO CRAFT STRENGTH.—A distinguished American journalist said recently, in summing up the results of the Washington Conference, that in subscribing to the Naval Treaty, Great Britain surrendered actual dominance of sea power, and the United States surrendered potential dominance. There is one aspect of naval strength, however, which was not touched by the Treaty, and in which it would seem Great Britain has surrendered her actual dominance to America, without a corresponding action on the part of the latter, and that is in regard to torpedo craft. The British proposal for the total abolition of submarines, as is well known, did not find favor with the Powers at the Conference. Had it

gone through, there is no doubt that a considerable reduction would have been possible in the strength of surface torpedo craft, for it was the menace of the *U* boats which obliged such a considerable expansion of these flotillas during the war. The relative strength of the leading Powers in destroyers and similar vessels, therefore, becomes of more consequence, and the figures on this subject contained in the recent official *Return of Fleets* deserve attention.

Dealing first with destroyers, it will be found that numerically America is fifty per cent stronger than this country, having 315 vessels, as compared with 200 flotilla leaders and destroyers in our own Service. If the age and tonnage of the boats be compared, it will be found that this preponderance in numbers very fairly reflects the increased power of the American flotillas. All but thirty-three of their boats have been launched since 1914, and all but twenty-one are of 1,000 tons displacement or over and carry four 4-in. guns. It is true that a note in the *Return* states that all destroyers before the *Wickes*, launched in 1918, may be considered as obsolete in estimating fleet strength; this would eliminate fifty-two vessels, but since thirty-one of this number are of the tonnage and armament mentioned, they can scarcely be called obsolete, and are certainly as good as, or better than, the majority of vessels in other fleets. Except in the Australian Flotilla, there are no British destroyers on the effective list launched or completed before 1916, but such a drastic reduction has not yet been effected, according to the *Return*, in the American Service. Japan has fifty-eight destroyers; France, fifty-three; and Italy, fifty-eight; so that these Powers are about equal, but in each case there is a high proportion of pre-war boats, so that, judged by English or American standards, their flotillas are not so efficient as the numbers would suggest.

As to submarines, it is well known that the lead in these craft is also held by America. In December last, at Washington, Lord Lee gave the following estimates of submarine tonnage of the Powers: United States, 83,540; Great Britain, 80,500; Japan, 32,000; France, 28,360; and Italy, 18,250. The new *Return* supplements these figures by the following numbers of boats: United States, 102; Great Britain, ninety-three; Japan, twenty-four; France, fifty; and Italy, forty-three. In the building list there are thirty-eight for America, eight for Britain, thirty-one for Japan, twelve (projected) for France, and four for Italy. The American flotilla is, moreover, composed almost entirely of modern boats; only seventeen were launched before 1915, in which year the oldest of the British boats were put afloat. The largest submarines under construction of which details are given are the three *Fleet* boats of the *V* type for the United States, which have a displacement of 2,114 tons on the surface and 2,520 submerged, and carry one 5-in. gun, one 3-in. anti-aircraft gun, and six 21-in. torpedo tubes. A great change has, therefore, come over the situation as regards relative submarine strength, for ten years ago Great Britain was superior to all other Powers, with France as her nearest rival, and her flotilla was more than twice as strong numerically as that of America. It is, of course, unwise to dogmatize merely upon the figures of the recent *Return*, since many changes are sure to be made in the next few years in weeding out vessels suitable for coast defense only or otherwise not fitted to play their part in modern fleet operations. But enough has been said to show that the submarine, which we sought to abolish, has, if anything, taken on a new lease of life.—By "a Sea Officer" in *Army, Navy, and Air Force Gazette*, 4 November, 1922.

AN OIL BLOCKADE WOULD CRIPPLE FRANCE IN A WEEK.—(By crowding France out of the Black Sea Oil Fields (Treaty of San Remo), did England alienate French interest and co-operation in the Near East?)—

Modern economic life rests upon fuel. Today power and influence go hand in hand with control of oil. Henceforth the nation without oil will have no navy, no army, no credit, and will find itself classed with the minor countries like Portugal. Without oil there can be no such thing as real national independence.

The French public does not realize that the German offensive on the western front was temporarily eased up in 1915 so that Germany might carry a stronger offensive into Galicia and Rumania in the search for oil; before all else the peace of Bucharest and the peace of Brest-Litowsk were The Peace of Oil.

The French public does not realize that the moment the eastern front was broken Germany had to lay down her arms for lack of oil for her many aircraft and army trucks.

It does not realize that at the most critical moment of the war, March, 1918, the shortage of oil on the part of the Allies almost resulted in the Germans breaking through the western front; and the greatest service rendered the allied cause by the United States, even greater than the United States Army, was their making available to that cause the 100,000 tons of tankers which were drawn from the Pacific.

The French public does not realize that for this inestimable service England has shown the United States ingratitude, and that this ingratitude has been in large measure responsible for America's policy of withdrawing from European affairs; that it has prompted the dissolution of interallied committees in which had been accomplished an economic and financial solidarity; that the curve of American sympathy for France follows closely the curve of French purchases of oil in America.

The French public does not realize that the treaty of Sévres was conceived with an eye solely to giving England control of oil fields in Turkey, pushing America to one side, while tricking France out of rights that should have been hers as succeeding to German rights.

The French public does not realize that by the strange and mysterious agreement of San Remo, August 24, 1920, the French Government practically signed away our political independence, not only in abandoning to England the fields in Mesopotamia, but also all of our oil interests in the colonies and abroad.

It does not realize that England's disdain of the German peril, so disconcerting to us, is based on this very mastery of the oil situation which she has acquired. You cannot carry on a war without oil; and without England's permission you cannot replenish with oil. Thus in England's eyes there is no more fear of Germany.

The French public does not know that France has become a scene of conflict between the two great Anglo-Saxon oil trusts and that from this fact in particular we are letting ourselves be driven to making a choice as between America and England, with a good chance of losing the friendship of both.

The world moves and the oil kings lead. They both instigate and suppress revolutions in Asia, Mexico, and Central America, to suit their own interests. Speakers appeal to ideals and excite passions. They are but tools of the oil magnates. In their dealings with Governments these latter meet power with power. They know how to control public opinion. During the war the flag of Henry Deterding, president of the Royal Dutch, was held in great respect by both sides until the Napoleon of oil definitely placed himself on the side of the English alliance.

We should look upon this cosmopolitan personage, almost denationalized as he is, as the head of a sort of super State of oil, as the personified control of an immense international force which has finally entered into combination with British imperialism.

From the point of view of oil, France was non-existent in 1914. France did not foresee the future of oil. She had made no real provision for oil. Under the protection of a tax law of 1871 France's oil needs were supplied by a league of ten importing companies, who were neither producers nor carriers and were hardly even refiners. Our oil fleet included fourteen small ships, of which but three were under the French flag.

These ten companies held a veritable monopoly of oil in France. They divided the territory among themselves and refrained from competition among themselves. Since the time when this league gained exclusive control of the French market, in 1893, it has been all but impossible for a competing company to get a foothold. Capital in the league is not more than 100 millions, while the profits on this investment amount to fifty millions annually. Thus oil costs more in France than in any other country in the world. Under a régime offering such large profits, and so perfectly assured, the beneficiaries of the system have no inducement to independent efforts or enterprise. Since 1904 the league of the ten companies holding the oil monopoly in France has been no more than a branch of the Standard Oil. No doubt some oil fields exist in France and in the colonies, but legislation as old as 1810 has settled all effort at prospecting. The rule of idleness, lack of interest, depression, absorption in internal quarrels, results in easy acceptance of things as they are.

Both America and England have faith in oil. They have but one thought—to push forward the time when oil will be the universal motor fuel.

By herself the United States consumes as much oil as does the rest of the world. At the rate they are going they will exhaust their own resources within a generation.

It is but natural that the two countries strive with all energy, speed, and capital to gain the premier place in oil. Imperialism passes from theory to fact.

Nothing can relieve the bitterness of the struggle between the two Anglo-Saxon competitors.

The form that the struggle will take is determined in advance by the differences in characteristics of the two peoples. And these differences have been shown up during the Great War.

Americans do not possess to the same degree as do the English the faculty of sticking to a line of action.

They lack a class of trained public servants brought up in a school of tradition. They are not so quick to discover the point of convergence between a matter of national interest and one of imperialistic power. From this difference their cause suffers.

In both countries there are powerful personages who come to the front without official authority or position and whom their Governments can disavow as necessary. Trusts are formed, group themselves about bankers and industrials, and combine in one big trust. This trust becomes the ally and associate of the public power (the Government). But it is never to be confused with it. The trust and the Government lend one another mutual help, but each reserves to itself sufficient autonomy, according to a formula which habit and ideas make it difficult for Frenchmen to understand.

Thus at the opening of hostilities the struggle was less between the United States and Great Britain than it was between the Standard Oil, under Mr. Bedford, and the Royal Dutch, which has a Bonaparte in Mr. Henry Deterding and a Talleyrand in Mr. Gulbenkian.

A few words are necessary as to these two trusts.

The alliance between Great Britain and the Royal Dutch Shell, including Mr. Deterding of the latter, was not an accomplished fact until

1918. Even though Mr. Deterding was favorable to the Allies and had foreseen their triumph, this Napoleon of oil did not fail to take all precautions. This is borne out when recording that alongside the Royal Dutch Shell and its associates in England we find two other oil trusts:

(A) The Anglo-Persian, which, directed by English and managed by trained specialists closely associated with the Admiralty, has taken for its special mission since 1909 the acquisition of the Persian fields. As we said in the previous article, "In 1922 the Anglo-Persian will be able to supply eighty per cent of the needs of England." Reaching beyond its original mission, it has established depots in all the large ports of Europe, including Spain and Hungary, and particularly in France. The imposing flotilla of monitors which England keeps on the Danube is for the protection of the Anglo-Persian.

(B) The British-controlled field, which, established under a Canadian law, takes for its special mission the evasion of the Monroe doctrine and completes the work of the Dutch Shell in Venezuela and around Panama, encircling two-thirds of the Caribbean Sea and operating with success in Ecuador and even in Brazil.

The coming of the war precipitated events.

The United States and the Standard Oil generously provided eighty per cent of the needs of the Allies during the war.

And England finds herself incontestably in the lead in 1922. Ten years ago she had no oil within her own domain. Today she holds half of the world's oil. In Mexico, where the immense resources would seem naturally to belong to the American system, England has, thanks to Pearson, now Lord Cowdray, thanks to a policy of handling the Mexicans, beaten out the Americans notwithstanding the small English capital invested. By similar audacity she is installed on American soil.

She has built a fleet of 252 tankers of 1,300,000 tons' capacity, compared with America's fleet of 191 tankers of 1,000,000 tons' capacity.

From this battle of giants England comes out the empire of oil. But the fight is not finished. The Standard Oil does not accept defeat. It has gained a foothold in France and more recently in northern Persia.

Whatever is to be the outcome, whatever the consequences at present impossible to predict, we cannot refrain from expressing admiration for a policy where Great Britain shows herself to be once more an imperial race. The vigorous initiative of men like Lord Fisher, Lord Curzon, Sir Marcus Samuel, Sir John Cadman, Lord Strathconan, etc., has made up somewhat for the weakness of the British democracy. Perhaps the most striking feature of the fight for oil is this revelation of an extra constitutional imperialism which governments by political parties had all but neglected. The man of affairs, the business man, is having his day. These uncrowned kings will not make a bad figure in history.

Why should France be denied the pride of possessing a similar class of men? Why has our League of Ten (oil companies) never had even the shadow of a thought of imperialism for France? It does not suffice to say that selfishness is the reason. Selfishness, self-interest, are human, not French alone; they are to be found among American, English, and Dutch business men. But while our compatriots are busy building up enormous private fortunes, men of affairs in other countries, especially in England, utilize the power of those fortunes in the interests of their Governments. Why? It is not that Frenchmen have less capacity for affairs, nor that our institutions are to blame any more than are those of other democracies. We come to the conclusion, then, that our failure is due to an idea of weakness transmitted to all classes of Frenchmen by those who should be our leaders. The kernel of that idea is that France should efface herself in the interest of universal democracy. And while

this Utopian thought is current, weakening the nation, those who accumulate large fortunes are concerned less with the nation's affairs.

Before the war France used annually 400,000 tons of oil furnished by the Standard through the League of Ten. Today she needs 1,000,000 tons. It costs us 2,000,000,000 francs per year for this precious oil for our aviation and for our ever-increasing number of automobiles and trucks for civil and military purposes.

So absorbed were our leaders in pacifist ideas and in false principles of nationalities that they had no room in their heads for even a thought as to a national policy as to oil.

We gave up everything, abandoning all to England. Our weakness and our generosity passes understanding.

By the agreements of 1916, Mossoul was in our sphere of influence in Arabia. But we gave up to England our territorial rights. And when we later made claim to fifty per cent of the oil there turned up at once a phantom of a "Company of Straw Men," created in 1914 and known as the Turkish Petroleum, whose rights it seemed easy to prove as antedating ours. It may even be said that by the inexplicable convention of San Reno we were evicted from our own colonies. English prospectors are operating in Algeria and are installed in Madagascar.

If we accept the theory that political freedom depends upon freedom of oil supplies, we may then look upon the San Reno agreement as a sort of treaty of Methuen. By this latter treaty Lord Methuen in 1703 made Portugal a practical dependency of England since that date.

Being dependent upon the will of others in future as to oil supply, all the armies, aircraft, automobiles, tanks, trucks in the world will be to no purpose. A simple oil blockade, set up with the least noise or ostentation, would cripple us in a week. Our national resources are limited to 60,000 tons in Alsace.

It is astonishing that the debate in the Chamber should have lasted through endless sessions on the subject of the new military law and without a thought being expressed as to the bearing of oil on the matter of national defense. No one of the debaters presented the not untenable hypothesis: Suppose Germany and France, or any two countries, confronting one another within the inclosure of an oil blockade sustained by the Anglo-Saxons. The belligerents would be at once thrown back to methods of 1885. They have had to give thought to this in Germany; but we have not given it a thought. We organize our defense as though we had at hand oil for all time. Where would we be if, lacking oil ourselves, Germany were to find a substitute, as she is no doubt bending every effort to do?

It remains for France to make a study of the possibility of developing a fuel from agricultural products that shall loose her from this bondage to the Anglo-Saxon oil trusts. We have a promising substitute already in use in the country, which is known as national fuel.

Up to the present it has been little more than an item for campaign speeches. Much has been said of the use made by Paris omnibus companies of a mixture of French industrial alcohol with benzol in 50-50 proportions; and the result has been modest.

At present industrial alcohol is under a State monopoly, and has been since a decree of August 13, 1919. This Control buys of 167 distilleries, of which 144 are from beet root. The sale price is fixed by the Minister of Finances.

A differential price accomplishes the profit of the system. The Control sells at a loss, alcohol for heat and light and for carburization. But it sells at great profit for exportation and what is used for perfumery, for druggists, vinegar industry. Under present conditions the business should

continue to realize important profits. However, with warehouses filled with alcohol in stock, the Control is not putting it to best advantage in seeking markets or in seeking to develop the more general use of it. This French monopoly, even when it seeks to disguise itself as an industrial concern and to assume the airs of a trust, such as they are known among Anglo-Saxons, is doomed to failure in advance. What it needs is vigorous development as a producer of national fuel. If it can be rescued from the realm of politics we may find freedom from the domination of foreign trusts.

Against the general use of alcohol as a fuel in place of petroleum there are great objections which must be taken into consideration.

The heat units of alcohol are considerably less than of gasoline (4,600 calories of alcohol as against 7,500 of gasoline), a difference which is reflected in the price.

Alcohol used alone requires the motor a high compression and retarded admission. Thus it is not interchangeable with gasoline and cannot be used in motors of ordinary type excepting by the admixture of benzol, ether, etc. Further, alcohol must be denaturized.

This difficulty would seem to be discouraging if we did not consider the agricultural advantages to be derived from the distillation of alcohol and the by-products of that distillation.

The secret of the agricultural success in Germany arises from her 10,000 small distilleries, all returning valuable by-products to the soil, enriching it to a point where its productiveness has been increased threefold during the last thirty years, and even enabling a military resistance much longer sustained than would otherwise have been believed.

No more is necessary to show that the national fuel is at a point where patriotic interest (freedom from oil trusts) is coincident with rural interests (fields enriched), and social interests (lower cost of living.)

Notwithstanding the inferiority of alcohol as compared with gasoline, then, there remains a large margin in favor of the former, so large that we should no longer hesitate. At the moment France produces 800,000 hectoliters of industrial alcohol. Let this be increased by ten times, which is not at all impossible, and we shall be largely freed from the evil consequences of San Remo.

It would be Utopian to hope for the total substitution for gasoline. There is some point to be determined by circumstances where the importation of oil and the production of alcohol would balance.

The question of a national fuel thus links closely with a national policy as to oil, to be closely followed, else France, after her supreme effort in the Great War, will fall into the estate of a second-rate nation.—Condensed translation of article by Count de Fels in *La Revue de Paris*.

THE SHIP SUBSIDY AND ITS NEED.—Some time ago the Shipping Board appointed a commission to study the history of ship subsidy in this and other countries and to make a report, on the basis of which a bill could be prepared to provide for practical aid for American shipping. Early this year the bill was before Congress with the indorsement of the Shipping Board and the Administration, and was referred to a joint committee of the Senate and House. From that time not much has been heard about the fate of the bill until the President called the special session of Congress and made known his intention of having the act come up in this Congress.

At the hearings before the joint committee, it developed that there were many who indorsed the bill with various reservations and proposed amendments, but there was little organized opposition. Those who favor the proposed legislation are solidly behind the bill and present convincing

arguments on every phase. Opponents argue just as convincingly on each and every angle and come out strongly against any Government aid or supervision of our merchant shipping.

SHIP MEN FAVOR PLAN

Steamship owners, ship builders and others interested in maritime matters favor a subsidy and indorse this bill with some few amendments, which, it is expected, will be offered for consideration. These amendments, it is said, do not affect the purpose of the act, but tend to define and limit some of the powers given the Shipping Board.

The act is intended to "aid the development and maintenance of the American Merchant Marine, to promote the growth of the foreign commerce of the United States and to contribute to the national defense." In order to accomplish this result the bill proposes both direct and indirect aids to shipping.

The direct aid consist of payments to ships on a speed and mileage basis. The Shipping Board is authorized to pay to the owner of every sail or steam vessel of 1,500 gross tons or over, documented under the laws of the United States and operated in the foreign trade, an amount calculated on the basic rate for each vessel of one-half cent (\$.005) for each gross ton of such vessel, for each 100 nautical miles traveled by such vessel.

From this rate of one-half cent, a sliding rate up to two and six-tenths cents per gross ton is provided according to the speed of the vessel. It is estimated that the direct payments would amount to about \$35,000,000 each year on a well-balanced fleet of about 7,000,000 tons—in other words an average yearly payment of \$5 for each gross ton of shipping under the American flag operating in the foreign trade.

NAVAL RESERVE PROPOSED

Other methods of direct aid are the establishment of a naval reserve to be paid from the merchant marine fund and the payment of about \$5,000,000 by the Postoffice Department for the carrying of mails. The whole fund, approximately \$40,000,000 is to be raised by the allotment of ten per cent of the customs duties, by the appropriation of all light and port dues, which are to be doubled in order to make a yearly return of \$4,000,000 and by the payment of the \$5,000,000 by the Postoffice Department mentioned above.

The naval reserve is to consist of officers and men of the merchant fleet; is to be controlled by the navy and paid by the Shipping Board through the navy. The Postoffice Department is to be allowed to ship mail on any ship accepting subsidy, the payment for which service is to be covered by the \$5,000,000 yearly payment to the fund.

Many indirect aids are also planned. Among these are tax exemptions estimated between eight and ten million dollars a year. Shippers who patronize American ships are to be allowed a deduction from their income tax of five per cent of the amount of freight money they have paid for the transportation of goods on American ships during the year. Ship owners are to be allowed to charge off an exception rate of yearly depreciation.

The Government is to remit all income taxes ordinarily payable by individuals or companies owning American ships engaged in foreign trade if a sum equal to the amount of the tax exemption is placed in a reserve fund to be used for the payment of half the building costs of new ships.

TO CREATE CONSTRUCTION FUND

The Shipping Board is authorized to establish a construction loan fund of \$125,000,000, from which money is to be loaned to ship owners for the purpose of building new ships. The interest rates chargeable are to be not less than two per cent. This fund may be loaned to citizens of the United States for the construction of vessels in American ship yards to be used in foreign trade and documented under the laws of the United States.

Loans can also be made for reconditioning of vessels now built. No loan is to exceed two-thirds of the cost of the vessel to be built, or two-thirds of the value of the vessel which is re-equipped. The Shipping Board is to acquire a first lien on the entire interest in the vessel to which the loan is made.

The sale of the Shipping Board fleet is another provision of the act. The Board is directed to sell, as soon as possible, all merchant vessels now owned by the Government. The sales may be public or private, and the purchaser is allowed liberal terms of payment. The purchaser is given fifteen years to complete payment, and the interest charges are not to be less than two per cent. All funds accruing from the sale of vessels is to be applied to the Merchant Marine Fund.

IMMIGRANTS TO BE CARRIED

Other indirect aids include the provision requiring fifty per cent of all aliens admissible under the immigration laws to be carried in American vessels. The method of carrying out his section of the act is also provided through the Consular Service. American Consuls in ports of departure are to specify, when application is made by the prospective immigrant, whether the applicant is to travel on a foreign or an American vessel. Provisions are also made for the inspection of all immigrants at the ports of embarkation who are to travel on American vessels.

Under the proposed legislation American ships will carry all officials and other employes of the United States and all goods or supplies owned by or intended for the United States Government. The army and navy transport services are to be discontinued and the vessels transferred to the Shipping Board. Private operators are to get all army and navy business if the act is passed.

This then is a brief sketch of the Subsidy bill as it is presented for passage. The outstanding features are the direct cash payments, the naval reserve, the mail contracts, the income tax deductions allowed to shippers and ship owners, the construction loan fund of \$125,000,000, the immigration provisions and the discontinuance of the army and the navy transport services.

DIRECT PAYMENTS ESTIMATED

The direct cash payments are estimated as amounting to about \$40,000,000 yearly, and the income tax exemptions allowed shippers to about \$10,000,000. This total of \$50,000,000 is the estimated yearly expenditure, but does not include the loss in income tax caused by the deductions allowed ship owners who set aside the whole amount of income tax on a ship's earnings toward new vessels, the loss in interest on \$125,000,000 which will probably be loaned at two per cent and the loss in income tax occasioned by allowing shipowners to charge off a greater yearly depreciation on their vessels. It is impossible to estimate this cost to the Government.

Proponents of the bill believe this huge expenditure will be justified by the establishment of an efficient American Merchant Marine capable of carrying at least one-half our foreign commerce. Those who oppose

the measure are of the opinion that the subsidy will not aid in building up the merchant marine of the country and contend that American ships can operate with more efficient management and with more modern and up-to-date vessels as cheaply as can those of any other country.

Crews' wages, feeding costs and other operating costs are more nearly on a par with those of foreign countries than ever before, it is claimed, and there are a few private owners doing business now who operate as closely as any foreign company in existence. It will be interesting to compare the arguments for and against the subsidy in an effort to present the facts.

One of the principal reasons advanced in its favor by backers of the Ship Subsidy bill is the much-talked-of differential in operating costs between American and foreign-owned vessels. It has been stated that it costs twenty-five per cent more to operate American vessels, chiefly due to higher wages, greater feeding costs, more expensive repair charges, carrying charges, etc. It seems difficult to tie down actual figures of vessels operating under private ownership for the purposes of comparison.

Opponents of subsidy legislation claim that one reason foreign-owned ships can operate more cheaply than American is rather on account of inefficient or inexperienced management and handling than on account of higher wages and other operating costs.

This is probably less true today than it was a year ago. It has been shown recently that American ships can operate even at the present low freight rates and do more than break even, not allowing, however, for interest on capital investment or depreciation.

FIGURES OF TRAMP SHIP CITED

The figures on an 8,000-ton American ship, classified as a tramp ship, show that crew wages for a three-month voyage amount to less than seventeen per cent of the total operating costs of the voyage. This vessel carried a cargo from a United States port to a European port and picked up another cargo for the return voyage to the United States. The figures are averaged on the entire number of days in port and at sea. The total cost of operation was \$430 a day, and was divided as follows:

	P. C.
Wage	16.3
Deck, engine and steward's supplies	7.2
Provisions	5.6
Bunkers	20.3
Repairs and renewals	1.4
Insurance	14.2
Port charges, including stevedore costs	28.8
Office overhead	6.2
Total (\$430)	100

The vessel for this voyage cleared a slight margin of profit over the above figures. There is no account taken of carrying charges other than overhead, but the Shipping Board operating costs do not carry such items as insurance and overhead as a rule. The ship was handled as closely as is possible, it is believed, and it would be impractical to cut further any of the above figures. Fifty per cent of the cost of running a ship is disbursed for insurance, overhead and loading and discharging cargo. The amount spent on the ship itself, such as wages, constitute the other fifty per cent.

VESSEL PRIVATELY OPERATED

It is not considered possible that foreign ships operate any more cheaply than the one mentioned above, but it must be remembered that this vessel was privately owned and operated, and had nothing to do with any sort of Government control. Foreign ships must buy provisions in whatever port they make, as do American ships; crew wages are not very much lower except possibly in German vessels; bunker coal was purchased at market prices, in various ports, as were supplies and provisions.

The cost of feeding a man a day was less than fifty cents, not an extremely low figure when it is considered that the Shipping Board has set a maximum for their vessels of sixty-five cents. If it were possible to get the operating costs of a British or Swedish vessel of the same type, it is quite certain that they would not be much less than those quoted above. There is no doubt that this operation can be continued for the time being at least, as it is now being done by every steamship company operating its own ships. To do this, however, it has been necessary to cut out waste in all departments, employ well-trained men on the ship, place more confidence in the masters of the vessels and also more authority and to make big cuts in office forces ashore.

Steamship companies are now using their masters in foreign ports as their agents, more so than ever before, and the net result has been to cut down large agency charges abroad. It is probably quite true that there is less grafting being done by American masters today than by those of any other nationality. Repair work that formerly went to the shop is being done by ship's crews. Every leak in the disbursement of a vessel must be carefully checked today, in order to keep operating costs at rock bottom, but it can and is being done.

SEEKS PRIVATE OWNERSHIP

The Shipping Board has made the statement that private ownership is the only hope of the American merchant marine. With this in view, the subsidy bill has provisions for the sale of the fleet of Government vessels and for removing the Shipping Board or other Government control of shipping. It has been pointed out, however, that the act as it now stands tends to increase the powers of the Shipping Board and will keep the Government in the shipping business indefinitely.

It is claimed that it will not increase trade, nor will it make the Government ships a more attractive proposition to the shipping man. Our foreign trade is one-sided, exports greatly exceeding imports, probably due somewhat to high protective tariff policies, and this prevents to a great extent the procuring of return cargoes by American ships from foreign ports.

Regardless of the subsidy, our merchant fleet to be a success must have sufficient trade to keep vessels loaded on all legs of their voyages. This building up of a permanent foreign trade can only be done, opponents of the subsidy believe, by long and patient work in an effort to give better services on American ships than on foreign vessels. It is further stated that Government control of shipping will hinder rather than tend toward hastening this end.

OWNER MUST MAKE PACT

A shipowner accepting subsidy must agree, under contract with the Shipping Board, to do certain things. To begin with, his ship must engage in foreign trade. His vessel must be built in the United States, regardless of costs. He must also make all repairs in an American yard, excepting those repairs which are necessary in foreign ports to allow the

vessel to continue a voyage. Three-quarters of the tonnage owned by an American owner must be registered under the American flag or none of his vessels will receive any Government aid.

If he makes over ten per cent profit on his vessel he must return one-half of what is earned over the ten per cent to the Government. His subsidy payments may be increased or decreased by the Shipping Board, according to their estimate of what his vessels are doing. If he takes advantage of the remittance in income tax allowed him, he must put it in a fund to be used toward building a new ship—the ship to be built as approved by the Shipping Board. He is allowed to borrow money from the board at a very low rate of interest, for the purpose of building ships, but the board is to hold mortgage on the entire interest in the vessel and to control the type to be built.

Those who do not believe in Government aid contend that the powers assigned to the board give to it virtual control over all vessels whose owners accept the subsidy. They claim that the legislation is regulatory and restricts business enterprise. Ship building costs will not decrease as long as American ships must be built here, and the owner must therefore carry a much higher capital charge than his foreign competitor. He cannot take advantage of lower prices in foreign markets, nor can he send his vessel to a cheap port for major repairs. It is pointed out that British ships today are repairing in Hamburg, Germany, taking the cheapest offer for the work, regardless of the fact that British shipyards are partly closed down and need business.

FEEDER LINES PREVENTED

The fact that three quarters of his tonnage must be registered in the United States prevents the shipowner from operating cheap feeder lines between foreign ports and under foreign flags, to aid in securing cargo for his ocean trading vessels. This method of procuring cargoes is considered one of the greatest aids to foreign trade.

Furthermore, there is nothing to provide for the disposal of the Shipping Board fleet. Some of the vessels may be purchased, but, in the opinion of the opposition, the bulk of the fleet will never be sold to private owners. That some of the vessels are already out of date or too expensive or unsuitable for operation in any sort of competition is well known. It is considered by many that it is cheaper to build a more modern ship than to recondition one of the expensive types of Shipping Board ships, at the prices paid, and they point to the fact that our shipyards now have a few new ships on the ways.

Lastly, the Shipping Board is going to stay in operation, with probably more departments than at present, subsidy opponents believe. Checking trade routes, voyage accounts, establishing the required amount to be paid each ship on each trade route, establishment and care of the merchant marine fund, the establishment of the \$125,000,000 ship construction loan fund and the arrangement of the loans to shipowners who wish to build ships and the control of the building and type of the ships will all require supervision.

Even more so will the income tax provisions and excess profit returns need expert attention, and once established and empowered to virtually control the country's shipping, it is believed that the Shipping Board would be a very difficult department to dispose of. All opponents of subsidy legislation are solidly behind the movement to take the Government out of the shipping business, but they are convinced that this proposed bill will not gain the desired end.—H. H. Burns in the *Baltimore Evening Sun*, 20 and 21 November, 1922.

CURRENT NOTES AND PROFESSIONAL PAPERS

"Wave Transmission of Power,"—(The second article on the subject of transmitting power by means of compression waves through a column of water. Describes the wave generator, piping, and rock-drilling equipment.—*The Engineer*, 3 November, 1922.

"Metal Airplane Construction,"—(A brief review of metal construction, followed by details of the Boulton and Paul system),—*The Engineer*, 3 November, 1922.

"Anti-Aircraft Searchlight Control,"—(Describes the Cotangent Method as "one of a number of possible methods of searchlight control" in night firing),—Captains D. D. Hinman and M. Morgan C. A. C., in *The Coast Artillery Journal*, November, 1922.

"Renewal of Naval Competition,"—(The Naval programs of five nations compared—the weakness of our Navy, and the cruiser problem),—by Graser Schornstheimer in *Current History*, November, 1922.

Pertinent articles in:

The Edinburgh Review, for October:

1. "Air Defense," by General Sir F. H. Sykes (a review of the entire situation, and recommending a Ministry of Defense to co-ordinate and control all branches of air defense).

2. "Washington Conference and Far East," by J. O. P. Bland. (A very comprehensive discussion of the subjects involved, and with a list of nine books recently published on the Pacific problem.)

The Fortnightly Review, for November:

1. "Russia's Red Army," by Edwin W. Hullinger.

2. "The New Turkey," by Clair Price.

3. "Kemal: The Man and the Movement," by G. M. Goddin.

4. "The Freedom of the Straits," by J. Ellis Barker.

5. "The Record of the Coalition," by Curio.

6. "After Sevres," by H. Charles Woods.

7. "Germany and the Reparations," by John Leyland.

The thirtieth general meeting of the Society of Naval Architects and Marine Engineers was held in the auditorium of the Grand Central Palace, Lexington Ave., and 46th St., New York City, on November 8-9. The following papers were read and discussed:

"Automatic Steering," by Mr. Elmer A. Sperry.

"Details of Naval Design from Jutland," by Commander Herbert S. Howard, C. C. U. S. N.

"The Application of Dyson's Method to Propellers of Ocean-going Merchant Vessels," by Mr. Edwin A. Stevens, Jr.

"Stresses on Vessels of the Great Lakes due to Waves of Varying Lengths and Heights," by Professor Herbert C. Sadler and Professor Anders Lindblad.

"A Study of the Wake of certain Models by means of a Current Meter," by Professor Edward M. Bragg.

"Some Experiments on Propeller Position and Propulsive Efficiency," by Rear-Admiral David W. Taylor, C. C. U. S. N.

"Efficiency in the Operation of Steamships," by Captain Daniel A. J. Sullivan.

"A 1,650-H.P. Gasoline Fire Boat," by Mr. Arthur D. Stevens.

"The Longitudinal Strength of Rigid Airships," by Professor William Hovgard.

"Machinery and Trials of the Passenger Ships of the American Legion Class," by Mr. Robert Warriner.

"Standardization as Affecting the Shipbuilding Industry in the United States," by Mr. Ernest H. Rigg.

"The Selection of the best kind of Propelling Machinery," by Mr. James L. Ackerson.*

The sixty-sixth session, 1922-23, of the Institution of Engineers and Shipbuilders in Scotland was inaugurated on October 24, when the President (Mr. Harold E. Yarrow, C.B.E.) delivered his address and a paper on "Sea Power or Air Force" was read by Lieutenant-Colonel Sir Alan H. Burgoyne, M. P.

Other meetings will take place on November 21, December 19, January 16, February 13, March 13 and April 10, in the Rankine Hall, 39 Elmbank Crescent, Glasgow, and the following subjects will be submitted for discussion during the session:

"The Treatment of Mild Steel," by Dr. Walter Rosenhain, B.A., F.R.S.

"Radio Telephony," by Professor G. W. O. Howe, D.Sc.

"The Development of the Sulzer Diesel Engine," by Engineer Lieutenant-Commander L. J. le Mesurier, R. N.

"Some Experiments on an Oil Engine," by Mr. A. I. Nicholson, B.Sc.

"The Beardmore-Tosi Diesel Engine: Testbed Results and Sea Trials," by Mr. Robert Love.

"Electrical Transmission of Power as Applied to Propelling Machinery," by Mr. W. J. Belsey.

"Electrical Appliances on Modern Vessels," by Mr. J. S. Rankin.

"Vane Wheels for Ship Propulsion," by Mr. Maurice E. Denny, C.B.E., B.Sc.

"Launching Velocities and Drags," by Professor Percy A. Hillhouse, D.Sc.

"The Application of New Freeboard Regulations," by Mr. A. Chisholm, B.Sc.

"The Longitudinal Strength of Bulk Oil-carrying Vessels," by Mr. T. R. Thomas, B.Sc., and Mr. James Turnbull.

"Modern Passenger Liners," by Mr. T. N. S. Dickson.

"The Arch Principle of Ship Construction," by Mr. Maxwell Ballard.

"A New Method of Boat-lowering," by Mr. Colin D. McLachlan.

*Copies of the above addresses may be obtained from the Society of Naval Architects and Marine Engineers, 29 West 39th Street, New York, N. Y., at 50 cents per copy or \$5.00 per set.

NOTES ON INTERNATIONAL AFFAIRS

FROM OCTOBER 23 TO NOVEMBER 23

PREPARED BY

ALLAN WESTCOTT, Professor, U. S. Naval Academy

TURKEY AND THE NEAR EAST

SULTAN'S RULE ENDED.—On November 1 the Angora Nationalist Assembly passed a resolution which dethroned the Sultan, asserted the right of the Assembly to elect a new Caliph as head of the Mohammedan Church, and declared the old régime in Constantinople at an end. The resolution further stated that it was the intention of the new Government to consider null and void all treaties, agreements, etc., negotiated by the Constantinople Government since March 15, 1920.

Rafet Pasha, the new Nationalist Governor of Constantinople, on November 3 assumed control in the city with popular support and without serious disturbances, the Allied High Commissioners accepting the change. At the same time the Nationalist authorities called upon the Commissioners to turn over control and end their military occupation of the city, and further demanded that warships seek Turkish consent before entering the Dardanelles. While adopting a conciliatory attitude, the Commissioners refused to surrender control, and were later supported in this position by a joint note from their governments. The tension finally decreased when the Angora Government on November 15 agreed to accept the presence of Allied troops under the Mudania Agreement, while protesting against interference in internal affairs.

FLIGHT OF SULTAN.—On November 17 the deposed Sultan, Mohammed VI, secretly escaped from his palace in Constantinople to a British battleship which took him to Malta. The Angora Government on the next day announced that the Crown Prince Abdul Medjid, cousin of the former Sultan, had been elected Caliph.

ALLIES AGREE ON POLICY.—Following the Nationalist *coup d'état* in Constantinople, Great Britain insisted that the Lausanne Conference on the Near East be postponed from November 13 until November 20, and that in the meantime the Allied Powers seek agreement upon a common eastern policy. On November 18 Premier Poincaré and Lord Curzon engaged in a five-hour conversation at Lausanne, which was announced to have "confirmed Allied agreement on all points." Great Britain was

supported by Italy in urging that Allied troops should remain in control of the Dardanelles for at least two years, until the League of Nations control (or such other as provided) should be in working order. This was justified as a precaution against a Turco-Bolshevist combination that might upset all southeastern Europe. Later Premier Mussolini of Italy joined the preliminary conferences. The main conference was formally opened on November 20. In spite of many signs of cross-purposes among the Allies, France appeared genuinely disturbed by the high-handed policies of the Nationalists, and by the bad example to Germany set by their success.

AMERICAN POSITION STATED.—The United States was represented at the Lausanne Conference by Richard Washburn Child, Ambassador to Italy, Joseph C. Grew, Minister to Switzerland, and Rear Admiral Mark L. Bristol, American High Commissioner at Constantinople. In an *aide-memoire* to the powers at the conference, Secretary Hughes refused full participation on the grounds that the United States had not been at war with Turkey and did not wish to share responsibility for the final peace settlement. The note, however, gave the following summary of matters "of particular American concern":

"2. The protection, under proper guarantees, of philanthropic, educational and religious institutions.

"3. Appropriate undertakings in regard to the freedom of opportunity, without discrimination or special privilege, for commercial enterprise.

"4. Indemnity for losses suffered by Americans in Turkey as a result of arbitrary and illegal acts.

"5. Suitable provisions for the protection of minorities.

"6. Assurances touching the freedom of the Straits.

"7. Reasonable opportunity for archaeological research and study."

AMERICAN TRADE IN NEAR EAST.—In connection with Secretary Hughes' statement of American interests, it may be noted that American trade with Turkey has increased from \$3,300,000 in 1914, to \$42,200,000 in 1920. This has been accomplished largely through the efforts of the American High Commissioner, with the assistance of American vessels in Turkish ports and of naval radio for business communications formerly carried via England.—From *Bulletin of National Association of Manufacturers*.

GREAT BRITAIN

ELECTION A CONSERVATIVE VICTORY.—The general parliamentary election held in the United Kingdom on November 15, resulted in a remarkable victory for Premier Bonar Law and the Conservative Party, giving them a majority of 85 over all other parties combined. Returns for 605 of the 615 seats were as follows:

Conservatives	355	Asquith Liberals	57
Labor	141	Lloyd George Liberals	42
		Others	10

In the London *Observer* Mr. J. L. Garvin praised Mr. Bonar Law's unsensational and dignified attitude in the campaign. He attributed the

result to (1) universal dislike of coalition government, (2) a strong anti-socialist and anti-radical swing, observable in England as elsewhere in Europe, and (3) desire for a more settled policy in foreign as well as home affairs. Parliament opened on November 21, with the ratification of the Irish Constitution as its first business. T. Ramsey MacDonald (Labor) became leader in the parliamentary opposition.

BONAR LAW'S MINISTRY.—The Bonar Law Cabinet, the first purely Conservative Ministry in seventeen years, was announced on October 25, with the Premier as First Lord of the Treasury, Lord Curzon continuing as Foreign Minister, the Earl of Derby as Secretary of War, and Lieutenant-Colonel L. C. Amery as First Lord of the Admiralty. Colonel Amery had previously acted as Secretary of the Admiralty.

DAIL ADOPTS IRISH CONSTITUTION.—The new Irish Constitution finally passed the Dail Eireann without substantial changes on October 25. The Constitution provides religious freedom, universal suffrage, a bicameral parliament (senators for 12 years), free elementary education, and establishment of the Irish Free State as "a co-equal member of the community of nations forming the British Commonwealth of Nations."

ITALY

FASCISTI SUPREME.—Following a Fascisti order for general mobilization throughout the country, Premier Facto and his cabinet gave up their offices. After some talk of recalling Giolitti or Orlando, the King on October 30, called upon Benito Mussolini, the Fascisti leader, to head the Government, thus reorganizing the success of the "Fascisti Revolution." In the cabinet which Mussolini organized there were five Fascisti, two Catholics, three Democrats, one National, one Liberal, and General Diaz and Vice Admiral di Revel as Ministers of Army and Navy.

The Fascisti movement is viewed as an organization chiefly of the youth of Italy, to control the government for the pursuit of a strongly nationalist policy abroad and a firm rule in domestic affairs. It drew many supporters from military officers after the reduction of military forces, and was looked upon as anti-radical. The organization, however, has interfered in industrial disputes on the side of labor, its leader is a former socialist, and it has the support of the Federation of Industry. At the opening of Parliament Mussolini spoke as follows of his foreign policy:

"In the same way as Italy does not intend to tear up treaties, so she does not intend to abandon her Allies, but Italy cannot permit herself the luxury of too much altruism. My formula for foreign politics is simple: 'We give nothing if we receive nothing in return.' Whoever wants from us concrete proofs of friendship must also give us such proofs of friendship."

GERMANY AND NORTH EUROPE

CABINET REORGANIZED.—The Wirth Ministry in Germany resigned on November 14, after the demand of the German People's Party (headed by Stresemann) for a full share in the Government, and the refusal of the United Socialists to take part in a coalition cabinet with the Nationalists included. Since the assassination of Rathenau, the Wirth Ministry had lacked direction, and its fall was anticipated.

President Ebert called upon Wilhelm Cuno, Director General of the Hamburg American Steamship Company, to form a new ministry, in the hope that a non-partisan business man might get together a working coalition.

REPARATIONS SOLUTION DELAYED.—On October 24 the Allied Reparations Commission decided to go again to Berlin, the British delegation agreeing to the French view that Germany should be declared in voluntary default, provided reforms were not carried out within reasonable time. No results were obtained from negotiations in Berlin, however, other than another German proposal for a 500,000,000 gold mark international loan to help stabilize the mark. This proposal disregarded the majority report of the committee of foreign experts called upon by Germany. This report recommended at least a two-year moratorium, but declared that permanent improvement could be brought about only by industrial and budgetary developments within Germany. The Reparations Commission delayed further action pending the change of ministry.

POLISH ELECTIONS.—The Polish elections held on November 5 and 12 resulted in a close division of both lower and upper houses between conservatives on the one hand, and members of the Farmer, Socialist, and Labor parties on the other. This left the fate of President Pilsudski undecided, since the election of the new president is by the Senate and Diet in joint session. The balance of power was held by the coalition of minor nationalities, with a total of eighty-three votes, which were likely to be given to Pilsudski.

UNITED STATES AND LATIN AMERICA

AMERICA TO JOIN WORLD COURT.—Pre-election speeches of Secretary Hughes and a report from the White House on October 31, indicated that negotiations were under way to enable the United States to participate in the League Court of International Justice. The only stipulation on the part of the American Government was a voice in the nomination and selection of judges.

WORLD COURT FOR TRADE DISPUTES.—Washington, Nov. 5.—Plans have been perfected by the International Chamber of Commerce, the American section of which has headquarters in Washington, for the establishment of a new international court of arbitration for the settlement and adjustment of commercial disputes between different countries.

The new tribunal will be the result of several years' study of international commercial arbitration and will be independent of all agencies established by Governments. The administration of the court will be directed from the headquarters of the International Chamber at 32 Jean Goujon, Paris. Twenty-seven nations in addition to the United States will name groups of representative business men to serve on the court. These will be Argentina, Austria, Belgium, Bulgaria, Costa Rica, Czechoslovakia, Denmark, Estonia, France, Great Britain, Greece, Guatemala, Haiti, Indo-China, Italy, Japan, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Soudan, Sweden, Switzerland, the South African Union and Jugo-Slavia.

"It has long been recognized," stated A. C. Bedford, Chairman of the American section of the International Chamber in announcing tonight the establishment of the new International Court, "that owing to differences in language and laws, the great distances involved, and limitations on means of communication, the ordinary legal procedure of settling disputes between nationals of different countries is fraught with extreme difficulty, expense and delay. From its inception the International Chamber of Commerce has believed that one of the greatest services it could render the commerce of the world would be to formulate a new plan whereby commercial disputes might be adjusted economically, promptly and equitably without recourse to the usual legal agencies."—*New York Times*, November 6.

CENTRAL AMERICAN ARMS CONFERENCE.—On October 23 the U. S. State Department announced that an invitation had been extended to five republics of Central America: Guatemala, San Salvador, Nicaragua, Honduras, and Costa Rica, to confer in Washington on December 4, for limitation of armaments. Formal acceptances and names of delegations were later announced. The agenda provided the following topics: (1) Negotiation of a treaty to make effective the general treaties of peace of 1907 among the five republics; (2) measures for limitation of armaments; (3) plan for arbitration of disputes. The conference grew out of a meeting of the presidents of Nicaragua, Honduras, and Salvador on the U. S. cruiser *Tacoma* in Fonseca Bay, August 20, 1920.

MEXICO PROTESTS INTERFERENCE.—In the Mexican Chamber of Deputies on November 17, Président Obregon read correspondence between American Chargé d' Affaires Summerlin and the Mexican Foreign Minister relating to Mexican oil legislation, and protested against what he declared to be American interference in Mexican legislative processes. It was voted that all South and Central American states be informed of Mexican resentment at such censorship.

It appeared that a Mexican act of congress had been given to the American Ministry before its passage, and sent to the U. S. State Department, and that Secretary Hughes had criticised its provisions in the belief that this was the desire of the Mexican Government.

CONTROL OF CHINESE RAILWAY ENDED.—On October 31, in line with the action of Great Britain, France, Italy, and Japan, the United States Government informed China of the ending of its share of the control of the

Chinese Eastern Railway. This control was taken over by an Allied board at the time of the Allied military occupation of Siberia, and was ended with the withdrawal of Japanese forces from Vladivostok. Attention was called to resolutions adopted at the Washington Conference requesting China to improve the administration of the railway.

REVIEW OF BOOKS

A Review by Captain Elliot Snow (CC), U. S. Navy

MACHINERY AND PIPE ARRANGEMENT ON SHIP BOARD, by C. C. Pounder, A. M. I., Mech. Eng., Lecturer in Mechanical Engineering, Department of Agriculture and Technical Institute for Ireland, published by Emmott and Co., Limited, 65 King Street, London: 20 Bedford Street, W. C. 2, 1922. Price about \$6.00 net.

As would be inferred from the title, this book does not touch upon land practice, except incidentally when explaining certain features of marine installations; naturally, as the book deals with machinery and pipe arrangements, it contains but very few details.

Apart from the preface and introductory chapter, this book, which deals entirely with English merchant practice, contains a little over four hundred pages. These are filled with many practical points of much value, and represent the author's long experience acquired in carrying through the designs of many and various kinds of marine machinery installation.

The order of presentation of the subject is a natural one; after an introductory chapter, the subject matter is presented in the following order:

Chapter II	— Engine Room Arrangement.
Chapter III	— Arrangement of Shaft Tunnel.
Chapter IV	— Boiler Room Arrangement.
Chapter V	— Auxiliaries.
Chapter VI	— Ship Construction.
Chapter VII	— Seating for Auxiliaries.
Chapter VIII	— Bilge, Ballast, Fresh Water, Circulating and Blow Down System.
Chapter IX	— Ship Side Fittings.
Chapter X	— Auxiliary Discharge.
Chapter XI	— Feed Systems.
Chapter XII	— Boiler Mountings.
Chapter XIII	— Main and Auxiliary Steam Pipes in Boiler Rooms.
Chapter XIV	— Auxiliary Steam and Exhaust Ranges.
Chapter XV	— Arrangement of Pipes on Funnels.
Chapter XVI	— Forced Lubrication and Water Service System.
Chapter XVII	— Miscellaneous Arrangement.
Chapter XVIII	— Ladders, Gratings and Flooring.

Chapter XIX	—	Cocks, Valves and Other Pipe Line Fittings.
Chapter XX	—	Strength of Pipes, Castings and Fittings.
Chapter XXI	—	The Ordering of Material.
Chapter XXII	—	The Technique of Pipe Arrangement.

These chapter headings, except in a few instances, indicate, without additional explanation, the nature of the subjects presented.

The preface correctly points out that the intelligent development of machinery and pipe arrangement is dependent on ingenuity and memory as well as experience.

The introductory chapter gives a very good general outline of the essential elements of a machinery arrangement and describes in a general way the layout of a large reciprocating engine installation and one of a turbine drive; these are illustrated by two plain line cuts.

The chapter devoted to ship construction deals chiefly and briefly with the definitions of the technical terms used when describing the structure of a vessel in and about the machinery spaces.

In the chapters devoted to auxiliaries and to the bilge, ballast, fresh water, and circulating systems, there are a few formulas and sample calculations which serve to illustrate the process of determining the size of pumps and piping. These are given in a simple manner and are easy to follow.

The miscellaneous subjects dealt with in Chapter XVII, are these:

- Fresh water distilling plant, and evaporator gear.
- Notes on steering engine arrangement.
- Refrigerating machinery pipe systems.
- References to electrical machinery and switchboard gear.
- Outline of ventilation schemes.
- Coolers for pipe lines.
- Drain traps and clinker discharge gear.
- Hull division arrangements.
- Engines, store and work shops.
- Spare gear and outfit.
- Demarcation of work and plans for survey approval.

The chapter on strength of pipes, castings and flanges, gives the survey requirements of several classification societies for steel and copper piping; also, diagrams and tables of thickness for gun-metal and cast iron pipes under various pressures.

Chapter XIX, on cocks, valves and other pipe line fittings, ends with convenient and simple formulas for calculating the size of helical springs, and includes a table of examples of these springs for various blow off pressures.

The technique of pipe arrangement which is made the subject of the last chapter in the book, as the author points out, concerns almost exclusively the draughtsman. It describes the use of line sketches; the amount of matter to be shown on drawings, and gives general advice on how best to prepare sketches, lists of pipe lines and fittings.

Of the tables which are contained in the body of the book, Table No. I, in the chapter devoted to Auxiliaries, gives the maximum lift in feet for hot water varying in temperatures from 130° to 195° F, and the minimum suction head in feet for temperatures from 200° to 240° F.

Table IV, which will be found in the chapter on Auxiliary Steam and Exhaust Ranges, gives the allowable velocity of steam through pipes of varying diameters. This chapter also contains a formula for determining the pressure of shock caused by the stopping of a column of water with due allowance for the elasticity of the pipe walls.

The tables given in the appendix are different from those usually incorporated in textbooks; they deal with the following subjects:

Friction losses in water pipes.

Friction losses of saturated steam in its passage through pipes.

Friction losses of superheated steam in its passage through pipes.

Friction losses at valves, and bends in piping, expressed in equivalent lengths of straight piping.

The subject of oil engine arrangement has been included in the text, and the references to the water tube boilers are not extensive. The author has deemed it necessary to hold these over, presumably for treatment later.

The book deals with elementary principles of arrangement rather than details. It is a good one to be consulted by instructors and those who have charge of directing the efforts of others less experienced in matters pertaining to British merchant ship practice.

A Review by W. O. Stevens

DAN QUIN OF THE NAVY, by Captain Edward L. Beach,
U. S. N., (Retired) The MacMillan Co., \$2.00.

Captain Beach has, for many years, been a successful writer of naval stories for boys, and this new book from his pen promises to win a still wider circle of boy readers. It is supposed to be the narrative, in his own words, of a Texas lad who enlisted in the navy. Naturally in a book of this character one hardly expects to find much in the way of character or plot, but one does find a succession of lively episodes leading to a good climax, involving a mysterious cipher and the theft of a fortune. It is just the sort of book that a boy of fourteen enjoys. It may be added that Captain Beach is considerate enough of the prejudices of a boy of that age to banish all females from the story. Dan of course had to have a mother, but the author kills her off in the first four pages, and after that our hero moves in a world composed exclusively of males.

The youngster who reads the book will find thrills aplenty. There is the fighting at Vera Cruz, the secret tunnel of San Juan de Ulloa and its mysterious treasure, the terror of being flung overboard at night in the open sea; but he will get also an interesting picture of life in the navy. Of course there has to be a certain amount of censorship, especially in the matter of language. Marryatt made his characters swear roundly,

but modern publishers are particular, and Captain Beach's sea dogs sweat and fight through 382 pages without a single "damn." In other respects, however, the picture is to the life. The hardships and discipline are there along with the excitement and fun, but the total effect on the reader will be to make him feel that being in the navy is a real man's job. Indeed it would be hard to imagine better navy propaganda than this book. At a time when there is danger of national indifference and neglect, it is well that one who knows the navy can write of it in a way that is bound to give the voters of tomorrow a happy mixture of information and enthusiasm about our first line of defense.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its fiftieth year of existence. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers upon subjects of interest to the naval profession, as well as by personal support.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of life, regular, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy, subsequent to joining the Institute, will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nomination shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be three dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

Sec. 10. Members in arrears more than three years may, at the discretion of the Board of Control, be dropped for non-payment of dues. Membership continues until a member has been dismissed, dropped, or his resignation in writing has been received.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly. Subscription for non-members, \$3.50; enlisted men, U. S. Navy, \$3.00. Single copies, by purchase, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE, 1924

A prize of two hundred dollars, with a gold medal and a life membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original article on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the article.

On the following pages are given suggested topics. Articles are not limited to these topics and no additional weight will be given an article in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original articles published in the PROCEEDINGS during 1923 shall be eligible for consideration for the prize.

2. No article received after October 1 will be available for publication in 1923. Articles received subsequent to October 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best article published during 1923 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more articles receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. The method adopted by the Board of Control in selecting the Prize Essay is as follows:

(a) Prior to the January meeting of the Board of Control each member will submit to the Secretary and Treasurer a list of the articles published during the year which, in the opinion of that member, are worthy of consideration for prize. From this a summarized list will be prepared giving titles, names of authors, and a number of original lists on which each article appeared.

(b) At the January meeting of the Board of Control this summary will, by discussion, be narrowed down to a second list of not more than ten articles.

(c) Prior to the February meeting of the Board of Control, each member will submit his choice of five articles from the list of ten. These will be summarized as before.

(d) At the February meeting of the Board of Control this final summary will be considered. The Board will then decide by vote which articles shall finally be considered for prize and shall then proceed to determine the relative order of merit.

6. It is requested that all articles submitted be typewritten and in duplicate; articles submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

H. G. S. WALLACE,

Commander, U. S. Navy, Secretary and Treasurer.

TOPICS FOR ARTICLES

SUGGESTED BY REQUEST OF THE BOARD OF CONTROL

Aviation—Its Present Status and Probable Influence on Strategy and Tactics.

The Anti-Aircraft Problem from the Navy's Viewpoint.

Co-ordination of the Naval Air Force with Other Naval Forces.

Naval Bases, Their Number, Location, and Equipment.

Military Character.

The Relation of Naval Communication to Naval Strategy.

Proportion of Naval Budget Which Should be Devoted to Naval Expenditures.

The Necessity for Having a Fleet.

Organization of Fleet for War.

The Offensive and Defensive in Gas Warfare.

The Best Protection from Gas Attack.

Naval Gunnery of Today, the Problems of Long Range and Indirect Fire.

Physical Factors in Efficiency.

The Relation between the Navy and the Merchant Marine.

America as a Maritime Nation.

Relation of the Medical Department to a Plans Division.

The Place of Mines in Future Naval Warfare.

A Mobilization Program for the Future.

Morale Building.

The Mission of the Naval Academy in the Molding of Character.

How to Best Educate and Convert the American People to the Need of a Strong National Defense.

The Navy in Battle; Operations of Air, Surface, and Underwater Craft.

Navy Spirit—Its Value to the Service and to the Country.

Based on a Major Ship Strength of Eighteen Dreadnoughts, What Do You Consider a Balanced Navy?

The Future of the Naval Officers' Profession.

The Naval Officer as a Diplomat.

Is the Present System of Training and Education for Officers Satisfactory and Sufficient?

The Role of the Navy at Peace.

Training Naval Personnel During the Next Ten Years.

Six Years of Promotion by Selection in U. S. Navy. Its Effect Upon Discipline and Morale.

The Employment of Retired Officers Separated from the Service by

Reason of the Age in Grade Feature of the Existing Selection Law.

What Measures Should be Adopted to Create and Maintain a Balanced Enlisted Personnel of 120,000 Men?

Our Future Naval Policy Based on Existing International Treaties.

The Future Naval Continental Shore Establishments.

Shore Duty for Enlisted Men.

The Limits of Specialization in Naval Training.

The Effect of the 5-5-3 Ratio Upon U. S. Naval Strategy in the Eastern Pacific.

Armor or High Speed for Large Surface Vessels?

Airplanes and Submarines Versus Super-Dreadnoughts.

The Navy's Relation to the Nation in World Affairs.

United States Naval Institute Proceedings

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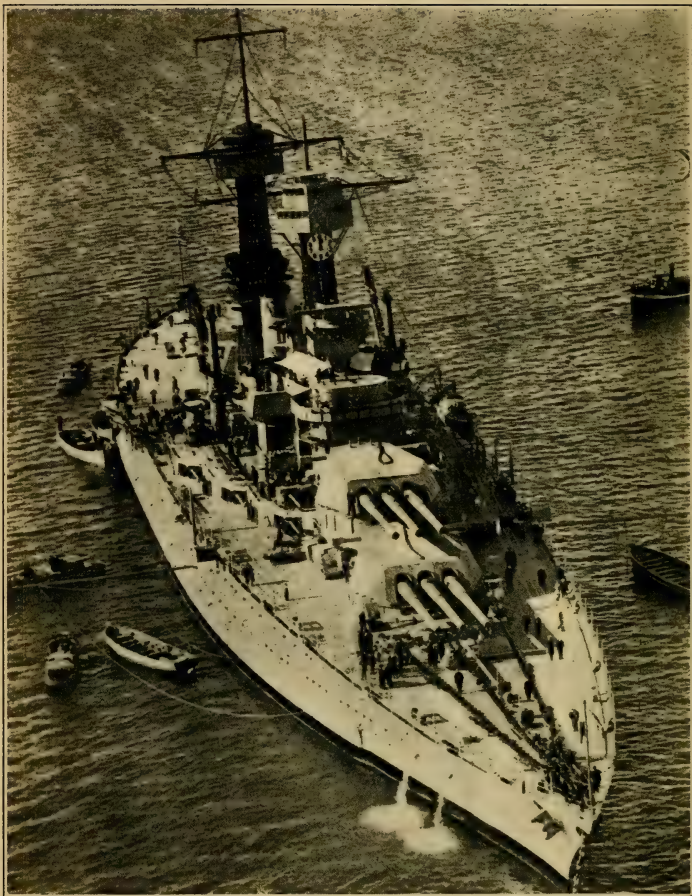


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U. S. S. "CALIFORNIA"

This photo, which was made from the air, shows the flagship of the U. S. Battle Fleet at anchor in the harbor at San Diego, California.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE PART OF ENGINEERING IN COMMAND

BY REAR ADMIRAL JOHN K. ROBISON, ENGINEER-IN-CHIEF,
U. S. NAVY

The general subjects of naval doctrine and the preparation of naval plans for operation and action were in a nebulous state at not so remote a period as to be beyond the recollection of a great many officers still on the Active List. Captain Mahan's deduction of the fundamental facts and principles underlying sea power, its foundation, development and exercise, was still under way at the Naval War College less than thirty years ago. Today officers have come to realize the necessity of carefully prepared plans, and general indoctrination has advanced far enough to make the skilful execution of these plans the rule rather than the exception. This fact is undoubtedly due to the Naval War College, and that institution has gained the deep appreciation, friendship, and respect of the entire naval service—not so much, perhaps, by what is taught there as by the success that has been achieved through stimulation of its graduates who have applied the basic principles of organization, logistics, command, strategy and tactics. These principles are developed by the technical study of naval history at the War College, and are today being applied in all of our fleets and in all the usual and regular work of the navy.

The concrete effect of the War College upon the navy may be said to include the development of the initiative of the subordi-

nate, and the making of that initiative conditional upon a thorough indoctrination of the subordinate. The introduction of the conference system not only improves the information of the commander, but secures that complete familiarity of the subordinate with the methods and plans of his superior that is necessary for the accomplishment of those plans. The individual study of tentative naval doctrine and the development of this doctrine as a result of its general study; the art of screening and scouting; the development of tactical plans; and the familiarity of the personnel of the fleet with the details of the execution of those general tactical plans; the formulation of general naval plans for the national defense—all can be directly traced to the development of a general consciousness of the necessity for logical reasoning, which has usually and properly been ascribed to the influence of the Naval War College upon the character of the naval personnel.

In the search for the abstract and unchangeable truths upon which alone sound deductions can be made, no small number of conscientious students have been diverted from consideration of the concrete facts—"engineering" facts, if they may be termed such—upon which accomplishments are to be based. The neglect of the concrete is a danger. Engineering in the broadest sense, so far as the navy is concerned, is the common sense that must be used in applying philosophy of the War College to the navy's general mission as well as to the routine problems of each day.

Everyone is familiar, in a general way, with the service that engineering is to the nation and to the navy, but in order to show the necessity of the possession by naval command of engineering experience it may be desirable to refer to a few of these services so that the conclusion will be obvious.

He who looks upon the engineer as the "human creator"—the one who multiplies the power of man by placing in his hands tools created by skill from otherwise useless material—makes a serious mistake. The engineer is worthy only to the extent his effort is dominated by the spirit of service for the good of others. The supreme act of creation was the breathing of the spirit of life into inanimate, molded clay. Today naval engineering creations derive value from the spirit of service breathed

into material things created by skill that these may become living forces for the betterment of the navy.

Studies of the practical application of the art of war, and particularly the actual exercise of command of naval units, must include thorough consideration of practical possibilities and limitations. In other words, the thought and the exercise of naval command, and the preparation therefor, must be directly connected with practical engineering problems such as occur in the naval officer's everyday life. Engineering includes two considerable divisions—operation and design. In our navy, the operating function is distinctly that of a line officer. At the same time, the character of the design affects the ease, reliability, and even the character, of the operation.

More and more is engineering experience necessary to wise decision by naval commanders. The scope of the engineer is widening. No one can safely prophesy limitations of the engineer's accomplishments. Even today one must be constantly informed both as to practice and as to future prospects, in order to appreciate the facts and thus be able to make an accurate estimate of the situation such as is always necessary before a wise decision can be reached. It is necessary today, in coping with the major problem of the national defense against a putative enemy, to appreciate what the enemy forces may be able to accomplish ordinarily, as well as to understand what the enemy may be able to produce or acquire under the stimulus of war operations. It is necessary, in the same way, to understand what our own people can do today, or under the stress of war. In order, therefore, that officers exercising high command, or training themselves for fitness for exercise of high command, in our navy, may be successful, they should know the difficulties and the possibilities of engineering. To put it tritely, the commander-in-chief should be able to read his signal book in terms of the BTU.

Success in action depends upon personnel and material. From another point of view it depends upon having the best weapons and upon the most skilful use of those weapons. One has only to glance into the present day situation to see that our weapons are almost exclusively those developed by highly skilled and educated engineers. Their operation requires engineering skill that

differs in quality but not in any degree from that of the skill of the designer.

Taking the problem as we have it, our unit of strength in weapons is represented by the ship. The four most important military characteristics of a modern vessel are protection, mobility, offensive power, and communications.

Protection is ordinarily stated as involving armor and hull subdivision, but it should be noted that speed and radius of action contribute to protection both in joining an action with the least possible damage to one's own ship and also in withdrawing from an unfavorable situation as we must do when the odds are unacceptable.

Mobility, in which, in the writer's opinion, should be included speed, radius of action, and economy of operation, is peculiarly and distinctly within the purview of the naval engineer. The matter of radius of action is closely allied with the subject of design and economy of operation. By suitable design and economy of operation, it is often possible through sacrifices of weight and space to add to the offensive power, as of guns, or the defensive power, as of armor. To bring the ship and her offensive power into an advantageous action or out of a disadvantageous action always requires a higher degree of mobility than that possessed by an alert enemy whose initial situation is as good as ours.

In *offensive power*, there should be included guns, torpedoes, and their appurtenances, all of which are distinctly the product of the designing engineer. The power to operate offensive weapons is derived from the same source as that which gives speed to the ship. Improvements brought about by the designing engineer may improve the offensive power. The guns and the fire control apparatus cannot arrive at the desired range without mobility. After the action is started the offensive power is of no value without the auxiliary power that is universally depended upon to operate them and this is furnished and handled by the engineer.

There are only three important long range methods of *communication* now in use, all of which are the product of engineering skill. The methods referred to are radio installations, signal searchlights, and the submarine oscillator.

Strategical and tactical success depend so directly upon communications that the writer has ventured to include these among the major military features of the naval unit. Communications determine the extent to which effective command can be exercised. Aside from indoctrination by education, association, or battle orders and instructions issued before the event, the only way in which the entire force of the whole fleet can be brought to bear at the point where the fleet commander desires this force to be applied, is through communications addressed to him by his scouts and observers, and addressed by him to his subordinates. The difference between a mob and a fleet is very largely a matter of communications. All of which, as must be manifest, is the product of engineering skill.

It takes no extravagant use of the imagination to appreciate the importance of engineering in giving to these four major abstract ship characteristics their power. No flight of fancy is necessary to show the vital interest of high command in engineering problems of the present day. Not only must high command have a knowledge of engineering problems, but the engineer must have a knowledge of the desires of high command. The two are inseparable. This is the logical reason for line officer engineers in all ranks.

From a little broader point of view than that of the individual ship, naval officers are taught that an advantageous strategical situation is created by location of forces not yet in action in such places, relative to the location of the enemy force, that the enemy will be confronted with a situation disadvantageous to him. Strategy is a geographical disposition of forces. It is impossible to accomplish an advantageous strategical disposition without superlative mobility. A few hours in time may be gained by superior speed. Nelson said five minutes may spell the difference between victory and defeat. A few miles in distance may be gained by superior radius of action. Strategical disposition therefore depends directly upon practical engineering considerations.

Logistics, and speed, and radius of action are inseparable whatever the type of ship. Economy of operation, and economy of design, enable a fleet to take up a strategical position that would otherwise be impossible on account of fuel consumption. The

amount of fuel consumed by a fleet of today engaged in an active campaign, especially an overseas campaign, is colossal. A small percentage of saving in the logistic requirements may mean the winning of a strategical position. It may permit the execution of some particular project. This again is distinctly an engineering problem and it is a direct and determining factor upon the character of plan that can be successfully accomplished.

It was a proper solution of a practical engineering problem that enabled the *Oregon* to join our other fighting forces in the Spanish-American War. It was the same solution of an engineering problem that enabled the slow battleship *Oregon* to overhaul and destroy the fast cruiser *Colon*. The *Oregon* did not possess men of more courage or patriotism than the men on the *Colon*, but the *Oregon* had solved an engineering problem and the *Colon* had not.

What but a proper solution of engineering problems enabled our transportation of troops and supplies to be handled in convoys during the World War? And the "We are ready now" of Taussig is but a statement that the engineering problems had been estimated, and a satisfactory solution had been found.

It is not sufficient for the flag officer or the commanding officer to know by painful experience, after it is too late, that his fleet or ship cannot take up an advantageous strategical position. He should be able to appraise the probability beforehand.

In joining action, certain tactical dispositions are desirable. Certain positions of aircraft, submarines, battleships, cruisers and destroyers are desirable, relative to the enemy's positions. Meanwhile communications must be preserved at distances that sometimes are very large. In the old days the weather gauge was of great tactical advantage; today the man in the fireroom is always beating to windward. The weather gauge has shifted to the steam gauge.

When we read of the engagement of the *Constitution* with the *Cyane* and *Levant*, what American can fail to be thrilled on reading of how the *Constitution*, fighting against two hardier antagonists, raked each in turn, and herself, by superb handling, escaped being raked by either of her antagonists? It was a remarkable illustration of what complete and thorough knowledge of the

motive power may accomplish. Today, by similar superior skill equally great tactical successes are available.

In order to achieve an advantageous tactical position, it is absolutely necessary that the operation of the engines and their design should be superlative, otherwise the guns and torpedoes will never come into best use. Speed makes difference between offensive and defensive tactics. To maintain an advantageous tactical position for a considerable length of time requires nice regulation of the speed, and that the motive power be reliable and economical. It is not enough for a flag officer or a commanding officer to know that his ship did not achieve a particular tactical position of advantage. He should know from personal appreciation of his ship what his limitations are and what the possibilities are. He should know whom to praise for realization of the possibilities and whom to blame for failure to achieve results within the range of accomplishment.

In naval warfare more than in any other activity, one is always told to "nurse his assets." The old order to save your powder until you can see the whites of their eyes has its parallel in the present day. In the last analysis, this parallel is due to the limitations of machinery. The commander of a fleet or the captain of a ship needs speed and endurance and reliability at the required time; he must have these at his command. In order that he may wisely depend upon having them he must insure that preparations are made by the individuals concerned at the proper time. This amounts, in a practical way, to nothing more than avoiding waste of energy and insuring the upkeep of material.

The character of our navy and its ability to achieve success are involved in these every-day engineering problems. Not only must individuals conserve their energy, and the energy of their material, when expenditure of such energy is unnecessary, but also the conservation must be uniform in character, and must be carried out conscientiously and simultaneously through the entire fleet, in order that the fleet may be able to respond effectively and simultaneously in time of need. This means that conservation of energy at unimportant times is not alone sufficient, nor is upkeep alone sufficient, the two must be conscientiously adhered to and must be performed in accordance with the best practice.

Perhaps there is no better way of indicating the wide effect of

engineering conditions upon the readiness of our navy for whatever service it may be required, than to consider current engineering problems. The naval engineer himself may not entirely realize the importance of the detailed savings accomplished by him until those details are aggregated, and the energy or money previously wasted is shown to have accomplished fleet efficiency.

In the study of naval plans for the national defense, one finds that the success or failure of our own forces in defending the interests of this government invariably depends very largely upon the securing of an ample fuel supply to the fleet. Experience in the recent war showed the enormous number of tankers required in order to conduct with success an active naval campaign. The problem of fuel supply seriously jeopardizes the success of our plans. These plans, however, are based upon present conditions of fuel consumption and supply. If these conditions can be improved, perhaps the plan can be made safely operable. Toward that end, the Bureau of Engineering has instituted such steps as the following.

The supply of fuel oil at Pearl Harbor is being increased by one and a half million barrels. This increase is coming from the royalty oil from Naval Oil Reserves. Similar increase is about to be undertaken at other naval fuel stations. Pearl Harbor came first because there the need is greatest.

The standard fuel of commerce corresponds to the lowest grade of naval fuel oil commonly called "bunker C." This is much more viscous than our standard fuel oil and requires heating to a much higher temperature to become sufficiently fluid for naval purposes. Tests have shown that if heated to these higher temperatures, that are still within the limits of safety, the commercial fuel oil is considerably more economical than our standard oil. Alterations are being made to our ships to enable them to use bunker C fuel oil. This oil costs perhaps forty per cent less, contains about five to six per cent more thermal units, and makes a corresponding increase in the radius of action of every oil burning ship. Primarily, it renders every naval ship able to burn any commercial quality of fuel oil. It improves our supply.

Fuel oil purifiers are being introduced upon our ships similar in design to the lubricating oil purifiers that have proved so suc-

cessful. These purifiers will, by removing the sediment and impurities in fuel oil, increase the capacity of a bunker from one and one-half to three per cent. These small gains may seem of little moment, but one per cent of three million tons is several tankers, perhaps the difference between success and failure. Obviously, if the navy can decrease its consumption of fuel oil a decreased amount will be needed.

Direct efforts have been made to improve economy, the most important steps in this direction being as follows:

A complete manual of approved engineering practice is being written and issued by chapters to the entire service as fast as it can be prepared. The seal of secrecy has been removed from this manual. A report has been received explaining the success that was achieved in reduction of fuel consumption in our destroyers stationed on the Asiatic Station. This report ascribed the entire economies to insistence by the command afloat upon the faithful and complete execution of the bureau's instructions for operation and maintenance of the machinery of these vessels. The system of inspections that forced fidelity to the general plan for operating efficiency was complete and the results are worthy of mention. The average fuel consumption underway per knot was reduced 32-3/10%. The speed was practically unchanged. The average fuel consumption in port was reduced 49-7/10%. There is no reason to believe that similar improvement cannot be achieved throughout the entire service by exaction on the part of command afloat of absolute fidelity to the manual of engineering practice issued by the Bureau of Engineering. In no other way than by insistence on the part of high command can this attainable engineering efficiency be rendered available for the navy. Naval men are of course human, and checking up on their work is necessary. Inspections of the work done should be so thorough that it is easier to do it right than to explain why it was done wrong. Unless we do it today, we cannot expect to secure on demand, when we need it, the fifty per cent increase in our radius of action that may be available by this one means. One whole section of the bureau organization is engaged in keeping our engineering instructions up to date gleaning information from all sources, but particularly from the fleet.

Improvements in design are being made. Evaporating plants

are being renewed with multiple effect low pressure plants that secure decrease in the back pressure on the auxiliary exhaust line with consequent decrease in steam consumption of all auxiliary machinery, the absence of live steam for the operation of these evaporating plants, together with a better grade and an increased quantity of distilled water. On the *Nevada* this installation is complete. It has been made simpler than previous evaporating plants and calculations have indicated that the \$45,000 spent on the *Nevada* for this particular improvement added ten per cent to the radius of action of the whole battle fleet. This because the *Nevada* happened to be the battleship of smallest radius.

The dense-air ice machines are being replaced by electrically operated CO₂ machines. We thus double our refrigerating capacity, halve our steam consumption, and, also, have much lighter refrigerating plants.

We are installing electric auxiliary machinery wherever we can to supplement or to take the place of steam-operated machinery. In every case the fuel consumption is very considerably decreased.

While it is the writer's firm belief that details such as have been referred to will halve the fuel consumption of our fleet, it is not claimed that more than one-third will be saved. In the last year an average improvement of twelve per cent has been made. The practicable decrease in the demand for tankers is enormous when the whole problem is taken into account. The solution of the problem of the naval defense of our country will be immediately facilitated by accomplishing such apparently minor, and apparently purely engineering economies in design, and particularly in operation, as have been cited. (It should not be forgotten that every decrease in the size of the train, such as any decrease in fuel consumption involves, increases the size of our combatant fleet by its decrease in the tangential effort required to protect the train. It is a problem in geometrical progression. When we decrease the percentage of the total weight of the naval "spear" that must be devoted to the "staff" of its supply, we increase the weight and strength and character of the spear-head.) This improvement cannot be made by good design and by correct and complete instructions alone. Co-operation is needed. Bad engineering on the bridge must be

avoided, and the mutual support and respect between engine room and deck increased.

There have been several cases of ships fitted with electric steering gear that have failed. The steering gear of the *Tennessee* failed when the ship was under the Williamsburg bridge, and the captain informed me that there was a lively few minutes on board, but that the tugs held on and saved the situation. To avoid a repetition of such accidents, a system has been devised whereby electric storage batteries are made available, so that the steering of the ship will not fail even if all other power is taken off the vessel. The cure effects no improvement in economy, rather the contrary, but it accomplishes safety where before an unnecessary hazard existed.

Similarly, added reliability of machinery is being secured by added shop equipment to capital ships and to tenders; the increased feed water capacity on many ships; the improved drainage facilities for turbines; improved foundations for forced draft-blowers; the simplified steam piping rendered possible by the elimination of steam auxiliaries; improved engines for submarines; and a large number of other similar details every one of which is decided upon solely on the basis of the improvement to the fleet's capacity for accomplishing the naval plans for national defense.

This is the mission of the Planning Section of the Bureau of Engineering. This section carefully digests reports of difficulties in operation, and makes recommendations looking to improvements of any nature which will result in more economical or more reliable operation of the motive power of the fleet. The bureau plans are subordinated to the general plans of the department and really form only a development of these plans. The General Plans Committee of the navy includes one officer from the Bureau of Engineering. The work of this bureau is intended—with a certain total naval force or effect—to increase the amount of that force which is at the points of contact and further to improve the effectiveness of the whole force with particular reference to those units in the battle fleet.

There are a great many improvements that progress in invention is rendering available, and that are being installed as fast as may be possible (experimentally, in the first place) for the

purpose of improving the fleet. Among these are very considerable improvements in radio; improvements in sound apparatus that are enabling the navy to secure continuous soundings, and that may have much wider applications in the future; improvements in the machinery of our smaller power boats, including, particularly, motor-driven life boats. Improvements are being made that have for their end a decrease in the quantity and variety of supplies to be carried; decrease in the weight, space and complexity of machinery; increase in the ease of overhaul, etc. Everyone of these changes is designed to make the fleet more reliable, more efficient, and, in general, to use the words of our present Secretary, more nearly "fit and ready."

One of the subjects of vital importance to the navy at the present time is aviation. Successful aviation demands the development of efficient, light, high power engines which must be thoroughly reliable in every particular. The most experienced engineers now on duty at that bureau are engaged in the solution of this problem, and it is believed that the results will be very satisfactory. They have not yet been attained, but the probability is that they will be.

To illustrate the importance of a small item, take the case of the *Maryland*. By installing a Diesel engine for port use, the main power plant may be shut down, all the electrical energy necessary is cheaply provided, and the heat from the engine is sufficient to furnish, at no additional cost, a large amount of distilled water. This distilled water is, to all intents and purposes, a free by-product.

It may seemingly be inappropriate to introduce the subject of money, but though the dollar is in itself nothing, yet in the aggregate dollars measure the degree of readiness that we can secure. It is unwise and hardly within the province of naval men to criticise the Congress for failing to give larger appropriations than they do. The navy's final mission is the execution of the policies of the country when the ordinary methods of diplomacy fail. After some of us have performed the duty of explaining the navy's needs, the policy of the United States is made manifest to us annually in the appropriation acts for the support of the navy. The criticism of the naval officer should be directed against the naval representatives, most of whom are

heads of material bureaus at the Navy Department, when these officers fail to present the naval needs completely or correctly to the Congressional Committees. It seems to the author that naval officers have no right to criticize the Congress for its action—be that wise or not wise; but they have an undoubted right to criticize their own representatives when these men fail to do their duty in representing, fully and frankly, naval needs and conditions to the Congress. These bureau chiefs are naturally more likely to receive approbation from their fellow officers than any constructive criticism that may enable them better to perform their duties.

One of the principal duties of naval men is to furnish as much navy as possible for the dollars that are appropriated. In pursuance of this idea waste has been stopped and funds available under the control of the Bureau of Engineering have been diverted as much as possible to material service of the fleet. Details include the use of material already on hand whenever practicable, the development of the idea of self-maintenance afloat, the placing of commanders-in-chief upon a fuel allowance, the giving of a money allowance to the commander-in-chief for distribution, in accordance with his desires for the purchase of materials, so that he, who from his position is best qualified to decide the imminent needs of the units of his command, may distribute it as he thinks best. All these have combined to enable the Bureau of Engineering to place more material upon the vessels of the fleet than would have been found practicable without the foregoing co-operation between high command afloat and the Bureau of Engineering.

It is the hope, and plans made so far are being accomplished, to continue the improvements during the fiscal year that is just starting. There is available during this year less than \$15,000,000 for the service of the machinery of the fleet. It is hoped, with this sum, that as much material will be put into effective use upon the ships of the navy as was possible two years ago, with more than twice this total expenditure for the same purpose. Expenditures ashore for navy yard developments, and for inspection and similar service, are naturally suffering. Expenditures for tests, experiments, and developments are not being decreased.

Instant decisions must be based upon personal experience and knowledge. Perhaps the wisest decisions follow quite extended conferences with a staff of experts, with the commander-in-chief as the arbiter. This sort of conference with experts takes a great deal of time, and to such as Napoleon or Nelson *time* is the key to success. Many a great defeat has been caused by deliberation before reaching a conclusion that personal experience might have enabled the commander-in-chief to reach at once.

In view of the fact that the decisions arrived at in many estimates of situations arising during war, must be based upon engineering knowledge, it seems vitally important that engineering training should be considered an essential requirement in the preparation for high command. The efficiency of the navy depends upon the acceptance of the principles that operation and maintenance of machinery afloat is a function of the regular line officer. Every line officer must be made capable by proper training to perform engineering duty commensurate with his rank. The officers selected in accordance with the authorization of law for "engineering duty only" provide the expert technicians required for engineering design and inspection, but it was not intended, nor is it well, that these officers should supplant the regular line officers in the operation and maintenance of machinery afloat. Our navy possesses a distinct advantage over other navies of the world, in that our regular line officers receive training in engineering, and the application of the principles of that science constitutes an important part of their duties.

In this connection it should be noted that the duty of an officer on board a modern battleship in every department, requires an accurate comprehension of the principles of engineering in its broadest sense. The course of instruction at the Naval Academy provides the theory, but it is necessary to supplement this instruction by practical training, and it is submitted that no duty afloat is more important than duty in the engine room for this purpose. Indeed, the opportunity to perform this duty is a great American naval chance to attain superior fitness and better command of our ships and fleets. Our captains, when considering engineering conditions, do not merely see tables of statistics and curves of performances: they see men toiling and accomplishing.

The efficiency of the navy is now suffering from a fallacious idea on the part of some younger officers, that engineering duty can be neglected without interfering with their development for high command. The existence of this belief is causing scarcity of officers capable of operating and maintaining the machinery afloat, a very serious condition which is now receiving the earnest consideration of the department. The senior officers of the navy are responsible to a great degree for this state of affairs. The attitude of senior officers determines the conduct of their subordinates. Engineering duty, which should be included in at least the first twenty years of the professional life of every line officer, will be accepted with liking and performed with zeal according to the respect for engineering shown by senior officers in the service.

In this connection attention is invited to the grave responsibility that rests upon the senior officers of the navy as regards the molding of the character of the younger officer. The navy is an enduring institution, its development is continuous, its spirit is a matter of association and example, as well as of tradition. What the captains say and do today determines the military character of the naval leaders of tomorrow. There should be a general accentuation of the importance of younger officers fitting themselves for important technical duties on board ship. It is feared that some of these young men have received a wrong impression of the naval teachings. In the stressing of the superiority of personnel over material, some of these young men have failed to appreciate that real ability and knowledge of technical material is an essential attribute of leadership. The members of a football team have very little respect for a team captain who does not know the game. Without this respect his efforts at leadership are futile.

Without failing in respect for abstract knowledge, it may well be emphasized that engineering duty requires direct contact with men, involves their leadership, and develops such traits as prompt decision, foresight, initiative and patience. Self-maintenance of the fleet is perhaps of most value because it strengthens the character of our personnel, for men always are more important than their tools.

Postgraduate instruction is of more value through the supply of ideas from outside sources that is thus secured, than in the award that it gives to officers that are allowed this opportunity to increase their ability.

The ideal must always be kept lighted up by ambition and hope. But ideas develop from facts. Details may wisely be left to subordinates if general principles are well understood by all hands. In creating ideas we start with molded facts and, breathing ourselves the spirit of service, strive to animate our facts by putting some of this same spirit into what was at first inanimate—dead. It is the quality of the spirit that possesses us, and that we transmit, that counts. The morale officer is the captain. He is the one who determines the spirit of the ship and in the long run it is he who is responsible for the very character of our personnel. The example and teachings of officers assigned to important sea duty go far toward molding the character of our younger officers. It is a great privilege but a solemn responsibility.

It is desirable to dignify all essential duties. The high ranking officer can inspire zeal by pointing out the opportunity of definite constructive service for the advancement of the interests of the whole fleet to the man in the dynamo-room, the fireroom, or the engine room; or to the senior charged with administration and improvements. The effect is bound to improve the service.

It is hoped that there has been indicated, in the foregoing pages, that there are many so-called purely material duties that will furnish ample field for foresight, and for the application of the principles and plans for the national defense. Engineering is service, and in the long run the *giving* of service makes for happiness as well as for the worth all naval men seek, that they may become worthy of those that have gone before.

DISCUSSION

The Part of Engineering in Command

REAR ADMIRAL HENRY B. WILSON, U. S. NAVY.—This article was referred to me with a request for a discussion. The article is timely but must be read with reservations, having due regard that Admiral Robison, my very good friend, is publishing this in the nature of a "sales talk," to interest young officers in engineering duty.

I say it is timely because it is common service gossip that certain officers have failed of selection because of "too much engineering duty." This may or may not be true. In my own experience on various Boards of Selection I have seen none passed for that direct reason. Some officers may have sought engineering duty repeatedly and have stayed in it so long, proportionately, as to fall behind their classmates in all around professional attainments, which may thus have caused engineering indirectly to shoulder the blame. This rumor has no doubt convinced certain young officers against seeking engineering duty. On the other hand, officers must perform whatever duty is assigned them and, especially in considering young officers, an officer's assignment is seldom his for the seeking. Unquestionably a senior much prefers giving a junior what he desires if feasible. This article is valuable in that it may turn more young officers toward seeking engineering duty to such an extent as to give them a well-rounded experience before reaching command rank.

I believe too that he should differentiate between engineering and marine engineering. True, as Admiral Robison says, many weapons are triumphs of engineering skill, but not necessarily marine engineering. Something of a similar nature might be said of his adoption of the communication service. As a far fetched example: pigeons are under the cognizance of the Bureau of Engineering, but it can scarcely be maintained that engineering experience is necessary for the care and upkeep of a pigeon. By all means let there be sufficient engineering training, but let us not lose our sense of proportion.

I believe that Admiral Robison has shown a commendable and quite common fault, in that he places his particular assignment supreme. In the Service, no one component of a fighting unit can be supreme. In his reference to the *Oregon's* and other triumphs of Engineering, he neglects to give any credit to the hull designers who built the ship on lines suitable to the propelling plant's power. Nor does he give the captain or the navigator credit for having chosen courses saving in fuel. And so I might go on, down to the ship's cooks who burned the galley fires economically that more coal might be available for steaming. *Reductio ad absurdum.*

In short, a successful fighting unit must be a fine example of team work. Admiral Robison has mentioned the four components. Each of these components is indispensable to the others. Supposing that the *Oregon* did make a wonderful engineering performance, of what avail was it save to carry armament to where it could be used? Conversely, of what avail would this armament have been unless the machinery had placed it where it could be used? We may liken a ship to a fencer. Communications are his brains and eyes, engineering his feet, offensive power his foil and hand, protection his mask and pad. A fencer equipped with all of these, meeting one similarly and as effectively equipped, will win if his skill and training are superior. So it is in the navy. A unit must have the four elements in proper proportion for success. A preponderance of any one causes a corresponding weakness in the others. Each is indispensable to success. Each is important. Each is vital. Excessive training in any one branch will cause a corresponding deficiency in the others. We must have trained engineers, but so must we have trained navigators, trained communication officers, trained ship handlers, trained gunnery officers, and so on through all the links of the chain of which each link must be strong, and not the least of these is a trained, capable captain, who can and does keep a happy, contented, earnest crew, full of enthusiasm for doing their particular mite toward making their ship the best ship in the thousand and one ways a ship can be successful, or unsuccessful.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DESTROYER EXPERIENCES DURING THE GREAT WAR¹

BY CAPTAIN J. K. TAUSSIG, U. S. NAVY

III. CONVOYING MERCHANT SHIPS

Being an account of the American forces employed, the transition from patrol system to convoy system, the organization, administration, and operation of a convoy, together with certain personal experiences and incidents that befell the writer.

THE QUEENSTOWN FORCES

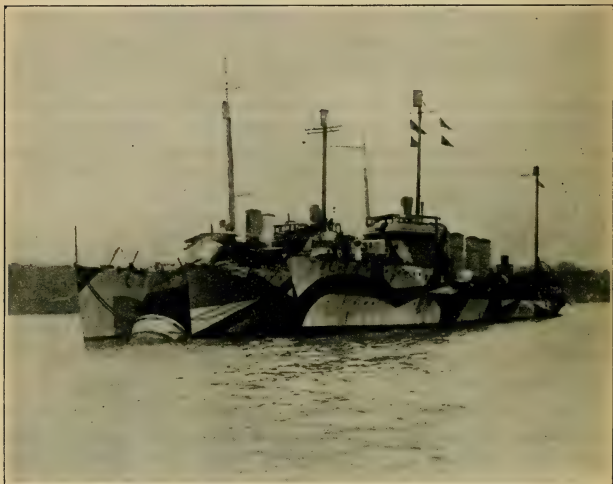
The thirty-five United States Destroyers based at Queenstown during the spring and summer of 1917, when the patrol was in operation, and during the transition from patrol system to convoy system were, numerically, only a comparatively small part of the vessels which were under the command of Vice Admiral Sir Lewis Bayly, the Commander-in-Chief, Coast of Ireland.

There were the light cruiser *Adventure*, Captain Hyde; a number of mystery ships which came and went in the manner their secret duties required; and the sloops, in reality gunboats, specially built during the war. These latter vessels carried the gentle sounding names of the flowers, such as *Buttercup*, *Snow-drop*, *Zinnia*, etc. Then there were the legion of smaller craft, the trawlers, drifters, mine sweepers, salvage tugs, and M. P. boats. Nor were these vessels the only ones that belonged to the Queenstown command. There were sweepers and trawlers at Berehaven which were later augmented by submarines transferred from Killybegs farther north. The *Vulcan*, mother ship, accompanied her charges to this new base. This submarine unit was commanded by the famous Captain Nasmith, who did such remarkable work with the submarines at the Bosphorus. Farther north, at Buncrana, there were destroyers and sloops in addition

¹ Commenced in issue of December, 1922.

to trawlers and mine sweepers, these latter being found *everywhere* that shipping went along the coast.

As the American destroyers increased in numbers, the British destroyers which had operated from Queenstown were gradually withdrawn to other fields. The largest British destroyer base which worked the convoys, more or less in conjunction with the Queenstown destroyers, was at Plymouth on the English Channel. This was a separate command.



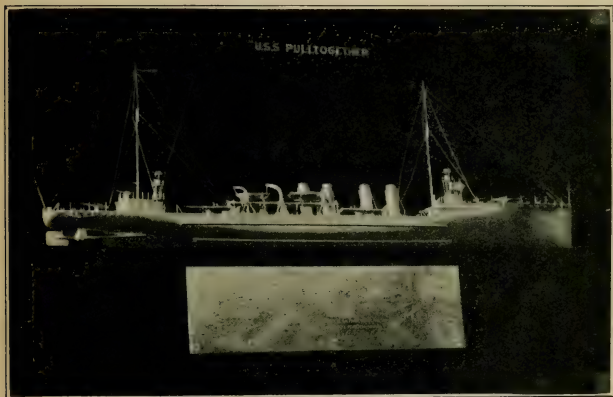
THREE U. S. DESTROYERS AT ONE OF THE QUEENSTOWN BUOYS

This shows the usual method of mooring

During the time of the patrol the destroyers used to come into Queenstown only at the end of every second tour. For the rest period, after the other tour, we went to Berehaven. This was to avoid congestion in Queenstown harbor where there was none too much room for so large a number of vessels. The *Melville* remained at Queenstown to take care of the destroyer wants at this place, and the *Dixie* was sent to Berehaven for the same purpose. As Captain Pringle was senior to Captain Price, these of-

ficers changed commands, it being the desire of Admiral Sims that the senior be always at Queenstown on the *Melville*.

After the convoy system was in full working order, the plan of alternating between Queenstown and Berehaven as rest places for the destroyers was abandoned; and Queenstown only was used for this purpose. This was for the simplification of administration, and because the outbound convoys started from Queens-



SILVER MODEL OF A U. S. DESTROYER

Presented to Admiral Sir Lewis Bayly, R. N., by the captains of the *Melville*, *Dixie* and thirty-five destroyers

Inscription

To

Sir Lewis Bayly, K. C. B., R. N., Commander-in-Chief, Coast of Ireland. Presented by officers in command of ships of the United States Navy who served under his orders during the struggle to preserve the freedom of the seas and to make the world safe for democracy.

town or from ports farther eastward. The *Dixie* returned to Queenstown and moored close to the *Melville* just above the Haulbowline dockyard. A large number of additional buoys were planted, extending up the harbor to beyond Monkstown, and down the harbor nearly to the Bar Rock buoy. During the patrol it was possible to assign the duties of the ships so that only a few were in port at the same time; but this could not always be done

when three or more convoys were being looked out for simultaneously. Under these conditions the harbor would frequently be practically abandoned of destroyers, and then again at times there might be as many as twelve or eighteen in port together.

The Queenstown destroyers were officially known as the United States Destroyer Squadrons Operating in European Waters. The Commander of this force was Rear Admiral Sims, who also commanded *all* the other United States Naval Forces in Europe. My first orders were to report to Admiral Sims, and from him I received the original operation order under which we carried on. Captain Pringle who commanded the *Melville* was Admiral Sims' Chief of Staff for the destroyers. He was also officially on the staff of Vice Admiral Bayly. He thus held an unusual and unique position, made necessary by the fact that Admiral Sims' extensive command kept him away from Queenstown the greater part of the time, and that, while the American destroyers at Queenstown were an administrative unit of the United States Forces in European Waters, they were, at the same time, under the orders of Vice Admiral Bayly for *operative purposes*.

Captain Pringle was the officer we destroyer captains went to for everything pertaining to upkeep, maintenance, personnel, supply, discipline, in fact everything administrative. Admiral Bayly was the one we went to for orders as to when we would go to sea and what we were to do there. Our reports of operations were made to Admiral Sims, through Captain Pringle, his Chief of Staff. Copies of these reports were sent to Admiral Bayly. It all worked out beautifully, and was a most perfect example of efficient co-operation, much of the credit for which belongs to Captain Pringle for his executive ability and unusual tact.

In disciplinary matters which concerned the personnel of both the British and American Forces, rather an unusual situation occurred. The first incident was a collision between the British sloop *Laburnum* and the American destroyer *Jarvis*. In order to place the responsibility in such cases Admiral Bayly decided he would order Courts of Inquiry under the British regulations; but the court in each case was to be composed of both British and American officers. The British Court of Inquiry corresponds to our Board of Investigation, there being three members, and no oaths taken unless specifically required in the precept.

In this first court, I was the American member, the British members being the flag captain, Captain Carpendale, and Commander Cochrane of the sloop *Myosotis*. Copies of the proceedings were sent to both the British and American Commanders, and each then decided what disciplinary action should be taken only insofar as the personnel of his own service was concerned. The court just referred to was, so far as known, the first time in history that British and American officers sat together on such a tribunal. There were quite a number of such mixed courts before the war ended.

TRANSITION FROM PATROL TO CONVOY

While the operations of the United States destroyers resulted in a decrease in sinkings, there were still far too many of these latter to warrant an optimistic viewpoint as to the final outcome. There had been, for a long time, a struggle for the upper hand between those in favor of the adoption of the convoy and those opposed to it. The reasons for and against have been given many times and will not be reproduced here. Finally the convoy advocates succeeded in persuading the Admiralty to try a few experimental ones. These proved successful, and from that time on the transition gradually took place, the destroyers being withdrawn from patrol duty as their services as escort vessels were required.

It took some little time to get the convoy system properly organized. For a while the destroyers would travel light one way. That is, we would take a convoy to sea, and come back to port without one; or would go to sea without a convoy and bring one back. This of course was an uneconomical employment of the destroyers; so as soon as the number of convoys increased sufficiently, and the organization and administration of their operations straightened out, the outbound convoys were so timed in departure that the destroyer escorts would proceed with them to the limit of the submarine danger zone, and then join company with an inbound convoy. By this method all the destroyers worked both ways.

The outbound convoys would be collected at Milford Haven or Queenstown, or sometimes they would be started from Liverpool, the escort meeting them somewhere in the Irish Sea. The kind of escort furnished depended on the character of the con-

voy and the vessels available. Sometimes the escort was composed of destroyers only, sometimes they would be mixed, destroyers and sloops, destroyers and trawlers, etc. On occasions when destroyers, sloops and trawlers ran out, the newer *P* boats were impressed in service. Quite frequently a mystery ship was used as one of our escort squadron, it being stationed, for decoy purposes, some distance from the convoy.

These early convoys made a great difference in the work and responsibilities of the senior destroyer captains, who, by virtue of their seniority became the escort commanders. While on patrol we had only our own ships to look out for unless we happened to be in company with a single merchant ship. But when the convoy started we immediately became division or squadron commanders with the tactical duties involved, and the responsibility not only of the escort vessels but, to some extent, of the convoyed vessels as well.

There was also some administrative work and paper work involved which had not been on our shoulders previously. For example when we received the operation order from headquarters the escort commander would, usually, on the morning of sailing, have a conference at Admiralty House with the masters of the vessels that composed the convoy. Here the plan of procedure was explained, instructions given as to methods to be followed under different circumstances, admonition to keep closed up, lights out at night, etc. These merchant captains had never before traveled in formation. They were now to be initiated under peculiarly trying conditions where they must not only keep position accurately, but by day they must zigzag, and by night they must keep their lights out. Many of them did not like the idea at all, some few bucked it, but the greater number came around in good shape and did their best to make the convoy system the success which it eventually proved to be. Before sailing each time, the escort commander had to issue an operation order to his force, and on return to port he was required to submit a report on the operations. Neither of these had been required while the patrol was in effect.

In the development of the convoys it was necessary in each case to give much detailed instruction which later became doctrine and could then be omitted in individual cases. However, there

was always much information to be imparted to all concerned. Let us follow through the mode of procedure in one such instance.

The escort commander would receive an operation order from the commander-in-chief. This gave the information concerning the convoy, its makeup, etc., the composition of the escort, and the time of departure. It was accompanied by the copies of all orders issued to the individual ships composing the convoy. These orders were:

- (a) Sailing orders.
- (b) A sketch showing the position of all vessels in convoy.
- (c) A sketch of the zigzag plan to be followed.

The sailing orders were complete as to detail in regard to: (1) time of getting under way; (2) order in which ships should pass out through the boom; (3) directions for passing through the swept channel; (4) the courses to be steered with positions to be passed through by the convoy so long as it remained together; (5) what to do in case escort leaves before dispersing position is reached; (6) the speed of the convoy; (7) the zigzag to be used, and for how long.

In addition the escort commander was given an envelope marked "secret," which contained the information, orders, and instructions concerning the inbound convoy which was to be met after the parting of company with the outbound one. These instructions were often quite bulky as they usually contained orders for the ocean escort commander and the commodore of the convoy. When a convoy left the United States, Halifax, Dakar, or wherever its starting point was, the destination of the different ships was not always known; or if they had been given a destination, this was changed after departure without their knowledge. This information had to be conveyed to the commander of the convoy so that the vessels could be rearranged in formation to facilitate the separation of the convoy into groups bound for English West-coast ports, Channel ports, or French ports.

There was also furnished the escort commander information of all convoys at sea or which would be at sea during the time he would be out. This was so as to avoid crossing one another

at night. When two convoys met or crossed on a dark night it created an ugly situation which no one cared to encounter.

A TYPICAL MERCHANT CONVOY

Having received the orders from the commander-in-chief, the escort commander would arrange for the aforementioned meeting with all the merchant captains at Admiralty House. There would then be a conference of the captains of the escort vessels on board that of the senior escort commander, after which the latter would issue an operation order to his force.

A sample of one of these operation orders is reproduced here:

1118.

U. S. S. *Wadsworth*.

7 October, 1917.

Memorandum Order.

From: Commanding Officer, U. S. S. *Wadsworth*. (Escort Commander)

To: Commanding Officers

U. S. S. *Wadsworth*

U. S. S. *Walke*

U. S. S. *Trippe*

U. S. S. *Tucker*

U. S. S. *Allen*

H. M. S. *Crocus*

U. S. S. *Shaw*

U. S. S. *Cummings*

Reference: C-in-C Queenstown No. S. O. 525 of 7 October 1917.

1. *Allen*, *Tucker* get underway 8 a. m. and proceed to Milford Haven. On completion duty with H. M. S. *Donegal*, request instructions by wireless.

2. *Wadsworth*, *Shaw*, *Trippe*, *Cummings*, *Walke*, *Crocus* get underway at 7:15 a. m. On arrival off Daunt Lightship scout to ten miles distance on following approximate courses:

Walke 220°

Cummings 160°

Shaw 200°

Trippe 140°

Wadsworth 180°

Crocus 120°

3. Return to Daunt Lightship by 11 a. m., and when convoy is formed take station as shown below:

θ *Cummings*

Shaw θ

θ *Trippe*

θ θ θ θ

Walke θ

θ θ θ θ

θ *Crocus*

θ θ θ θ

θ θ θ θ

θ *Wadsworth*

4. Make as wide zigzag as practicable to best cover area and protect convoy having consideration for state of sea, visibility, and necessary fuel economy.

5. When outbound convoy is dispersed come within easy signal distance of *Wadsworth* to receive instructions.

6. Stations for incoming convoy will be same as for outgoing convoy. *Allen* and *Tucker* will take station five miles ahead and about 3 points on starboard and port bows respectively, of the convoy. They will close in on convoy if poor visibility makes this desirable.

7. When convoy separates, *Trippe*, *Walke*, *Shaw*, and *Crocus* will return to Queenstown. Other destroyers will form screen around two west coast ships as follows:

Allen—ahead,
Cummings—starboard bow to beam,
Tucker—port bow to beam,
Wadsworth—astern.

8. Force answer to call sign X.

9. For outgoing convoy C. B. 585 is in effect (this will be distributed to U. S. destroyers tonight.) For incoming convoy C. S. 04 is still in effect. Attention is called that when C. B. 585 is used all courses signalled are magnetic and when C. B. 04 is used courses signalled are true.

J. K. TAUSSIG.

In the outbound convoy there were sixteen ships. It will be noted that one of the escort vessels was H.M.S. *Crocus*, a British sloop. This frequently happened when there were not sufficient destroyers available.

At the appointed time the destroyers would get underway and stand out to sea. This was usually about two hours in advance of the convoy. The escort would then spread out and make a "sweep" for a distance of ten miles off the lightship. This was to search for submarines and, if there should be any present, to keep them under while the merchant ships were leaving harbor, passing through the swept channel, and forming up afterwards. This latter was usually a slow process owing to the inexperience of the personnel in tactical maneuvers. The escort vessels would return from their scouting in time to join the convoy on its arrival off the lightship. Here would commence a shepherding process where the merchant ships were the sheep and the destroyers the collies. It was something of an effort to round the convoy into shape, but when once done, and we were finally on our way, we settled down to routine zigzagging with only now

and then a break in the formation caused by some ship not keeping position.

In these early merchant convoys the ships in formation were placed at intervals of 1,600 yards and at distances of 400 yards. This gave a comparatively wide front and shallow depth. The destroyers or other escort vessels were stationed ahead and on the flanks, with one astern to keep the ships closed up and to be in position to attack any submarine that might pass through the formation. The speed of these convoys was, of course, determined by that of the slowest ship, which frequently was not over eight knots. Then about one knot in advance was lost through the zigzag, and usually another knot was lost owing to the prevailing westerly sea which knocked down the speed of all ships.

For forty-eight hours or more the convoy would proceed to the westward. Then when reaching the dispersing point, or if the dispersing point had not been reached by dark of the day on which due, the signal would be made for the convoy to separate, and each vessel would be left to its own resources for the remaining trip across the Atlantic. The destroyers would assemble, and the escort commander would set a course and designate a speed to take the force to a daylight position well in advance of the rendezvous for the incoming convoy. A radio would be sent to the ocean escort requesting his time of arrival at the rendezvous. These merchant convoys were usually several hours late and often much more, which necessitated the escort vessels proceeding farther to the westward than originally contemplated.

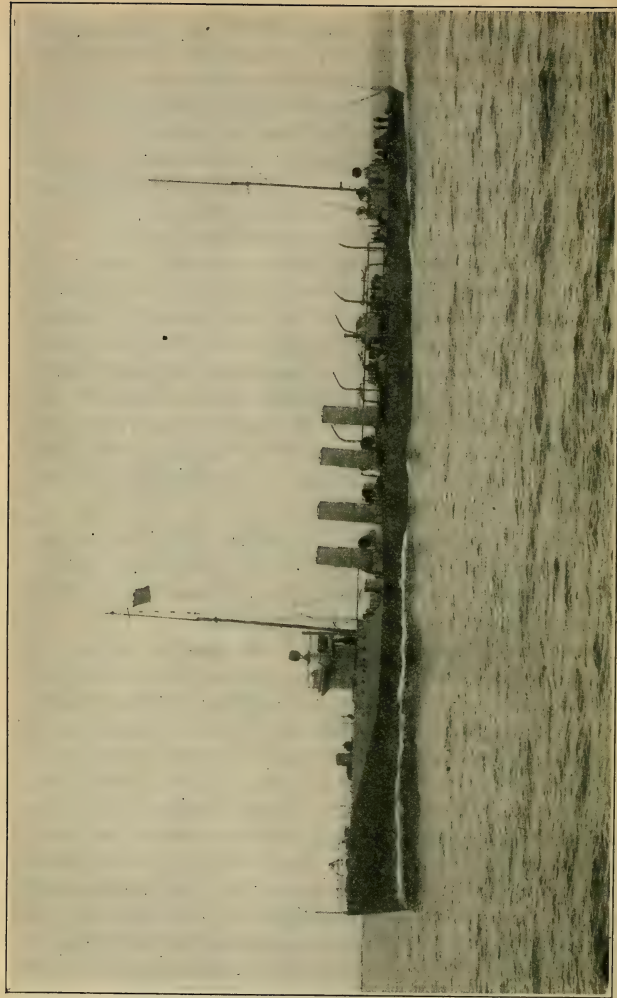
At daylight, having obtained a position well in advance of the on-coming convoy, scouting line would be formed, the distance between ships depending on the known accuracy of our own position, and the visibility conditions. Westward the scouting line would proceed, and usually at the expected time, or a little later, one of the scouting vessels would sight smoke or masts or the hull of a ship, again depending on atmospheric conditions. This destroyer would flash out the code word for "contact." All others knowing his position in line would immediately alter course so as to assemble on the convoy. No further signals were necessary, each destroyer knowing his place and taking it, immediately beginning to patrol at a distance of from 800, to 1,200 yards from the nearest merchant ship. The escort commander would

then communicate with the commodore of the convoy, giving him such orders as were directed by the Admiralty. These orders were either signalled by semaphore, shouted through a megaphone, or, if the sea was sufficiently smooth, sent aboard by a heaving line from the merchant ship to the destroyer.

Another two days would be taken up in the eastward passage. Then re-arrangement of the vessels of the convoy would take place in order to facilitate the separation of vessels bound for destinations in accordance with the Admiralty instructions. A radio would be received from the escort commander of the Plymouth destroyers asking for our position relative to their designated rendezvous, which was the position where the convoy would separate into two parts, or perhaps three. Then the British destroyers would make contact and assemble, the convoy would be divided, the British escort going with the ships bound for the English Channel and French ports, the American escort proceeding with those bound for Irish and West English ports. This procedure varied at times according to the destinations of the ships, and the escort vessels available.

If there were only a few of the convoy proceeding up the Saint George Channel and the Irish Sea, some of the Queens-town destroyers would immediately return to base, thereby being ready that much sooner for the next assignment.

If there was no submarine activity in the Irish Sea and Bristol Channel we would drop our convoy off the Smalls lighthouse which is at the western end of the southern Welsh peninsula. Here the final instructions would be given each master as to the route to be followed until arrival at Liverpool. If there was submarine activity in the Irish Sea the destroyers would have to continue as far as the Skerries. When it came near the time for the destroyers to part company with the convoy they were all on *qui vive* for the radio order, "Return to port." Immediately on its receipt, hard over would go the rudder, black smoke would come from the stacks, and speed increased to 20 knots for the run back to Queenstown. We may have been out six, seven, or even eight days, during which time we had been more or less on a nervous strain, there had been considerable discomfort for at least a part of the time, and the fresh provisions had not lasted



U. S. S. "WADSWORTH," DESTROYER No. 60
Flagship of Commander Taussig

through. The three days' rest before us at Queenstown looked very tempting, and we could not get there too soon.

AT QUEENSTOWN

Everybody who served at Queenstown seems to have a kindly feeling for that place, this in spite of the arduous duties performed by all hands. There was, of course, a reason for this, and the reason was the considerate way in which those of us who were performing strenuous duty at sea were treated during our stay in port. The organization and administration of these Queenstown forces were so complete and perfect as to detail that everything always proceeded like clockwork.

As the destroyer neared the entrance to Queenstown Harbor she would flash, on the searchlight, the private signal for the day and her own distinguishing call. This immediately would be answered by the signal station high up on the hill at the harbor entrance. Before reaching Roche Point a signal to this effect would come: "From C-in-C to *Wadsworth*: Go alongside oil jetty," or "Moor to buoy number 3." Never did we have to wait for instructions, or to ask for them. As soon as we secured there was no question as to what was to be done. Immediately fires were allowed to die out and machinery disabled as necessary. We knew, unless orders were received to the contrary, that we would be in port for three days. Two at a time the destroyers would be refueled until this process was completed. The movement to and from the oil jetty was done by tugs so as not to interfere with our work on the machinery. All hands on all destroyers immediately turned-to to get the ships ready for the next tour of duty. This was done before resting.

Hardly would we be tied up when the repair officers from *Melville* or *Dixie*—whichever ship was mothering us—would come on board. There were Lieutenant Commanders Church, Dunn, Laird and Campbell, or their representatives, always on hand to find out what was wanted, and we always wanted something. The crews of the *Melville* and *Dixie* were busy night and day on the continuous duty of keeping these thirty-five destroyers in operative condition. Each destroyer was averaging over 6,000 miles running every month, and this in all kinds of weather and under trying conditions. By the middle of November,

1917, my own ship, the *Wadsworth*, had in its two years of commissioned life steamed 73,000 miles. We were no exception to the hard service seen by all. It is simply mentioned here to show why it should be expected that the *Melville* and *Dixie* were kept busy. And they never failed to complete their work on time.

Either on the day of arrival, or, on one of the following days before departure, the signal force would bring aft a message of this import: "From Admiral to Captain: If you have nothing better to do would you like to come to dinner at seven thirty tonight?" or, "Will you come and have tea with the niece and me this afternoon?" To which there was always sent back the same reply: "From Captain to Admiral: W.M.P.," which we had learned was the British Navy way of saying, "I accept with much pleasure."

The officers, of course, found their own means of amusement during stays in port. There was one general meeting place for all, the Royal Cork Yacht Club. Here the clans usually foregathered before proceeding on their devious ways; and here again they met before catching their boats back to their respective ships. Pleasant walks in the country were always available. There was tennis for those who liked tennis, and golf for those who liked that form of sport. For those who cared for society there were lots of charming people to meet who were always more than cordial to the American officers. Now and then there were informal dances. One part of the Admiralty grounds known as the "Sloop Garden," had been set aside by Admiral Bayly for the use of the Commanding Officers of the British sloops, and the families of such that happened to be at Queenstown. These courtesies were extended to the captains of the American destroyers. Here was a good tennis court in the midst of shade trees and lovely flowers which we were allowed to pick at will. And here the ladies, led by Mrs. Douglas, the charming American wife of Lieutenant Commander Douglas of the British Navy, dispensed tea during the afternoon sessions of tennis.

For the men, recreation was more difficult to find. This especially after Cork was placed out of bounds. There were nice attractive girls a plenty for the young men whose tastes inclined them that way; and quite a few were married in Queenstown. The amusement center was the Enlisted Men's Club, which was

started by a donation from Americans in London. This club, from a modest beginning, grew to be a large well-managed affair—entirely in the hands of the enlisted men—excepting for such supervision as was desirable by a committee of officers. The club contained everything such a club should have, including a moving picture hall, and a restaurant, where the men could get a better meal at much less cost than was to be had in town. There were also limited sleeping accommodations.

Every Saturday night there was a vaudeville show, the performers of which came from the various American ships, with now and then the British sailors or marines furnishing a turn. On these Saturday night occasions all the officers in port usually attended, the gallery being turned over to them. Admiral Sims always went when he was in Queenstown. Efforts to get Admiral Bayly to attend were unsuccessful. It was rumored that he stated he was not going to attend any festivities until an American destroyer brought in a German submarine. He did attend the Saturday following the *Fanning's* successful coup.

I must not dwell too long on the pleasures of our short stays in port. But there was one pleasure that happened each time to all commanding officers; which pleasure was also a duty. This was the visit to Admiral Sir Lewis Bayly at 10 A. M. on the day following our arrival in port after a tour at sea. It was a standing order that such visit should be made, the time always being the same no matter what hour our ship got in. At ten o'clock the "puff puff" boats would start leaving the destroyers, each carrying its respective commanding officer. At the dock we would gather in twos and threes and walk together up the steep hill to Admiralty House.

Here all of us would meet in the ante-room and wait for the Admiral to announce his readiness to see us. Sometimes there would be only five or six of us, and sometimes as many as fifteen or twenty. Then there was a comparison of experiences and a detail of happenings, with nearly everybody talking at once. Some had lost a ship of their convoy by its being torpedoed; somebody had picked up survivors; others had been through different trying experiences; while still others had found an amusing side to an incident. Whatever it was, each one unburdened himself to whichever of his associates would stop talking long enough

to listen. Then when the messenger stepped in and announced that the Admiral would see us, a hush fell and we passed silently into the Admiral's office.

Sir Lewis was always seated at his desk with one or more official papers at hand. If he happened to be engrossed in something he did not look up immediately; but it was never long before he greeted us with:

"Good morning, gentlemen; please sit down."

Then he would listen to anything any of us had to report, and when finished he would say what he had to say, which usually was not much. Then would come:

"That is all, gentlemen; suppose you step down to the operations office and find out what your next duty will be."

It made no difference to us whether our interviews with the Admiral on these occasions were long or short, we were always glad they took place. We liked the personal interest he showed in our doings, and it often gave us opportunity to mention something that would otherwise never have been spoken or written. We were certainly kept in close personal touch with the Admiral, and it is the personal touch which appeals.

The operations office was in the basement, in what was formerly the billiard room. Now the billiard tables were covered over with boards and on them were spread charts on which were plotted the positions of convoys, submarines, etc. In this office we would be greeted by one of the three duty officers, Commander Herbert, Commander Grubb, or Lieutenant Commander Douglas, all of whom had seen long active service, and were having a spell of shore duty. Commander Grubb had completed three years of strenuous destroyer duty when he came to Queens-town. He was an active, efficient officer, cheerfulness being one of his chief characteristics. He always greeted me with a cheery: "Hello Wadsworth!" in which he pronounced the *a* like the *a* in bad.

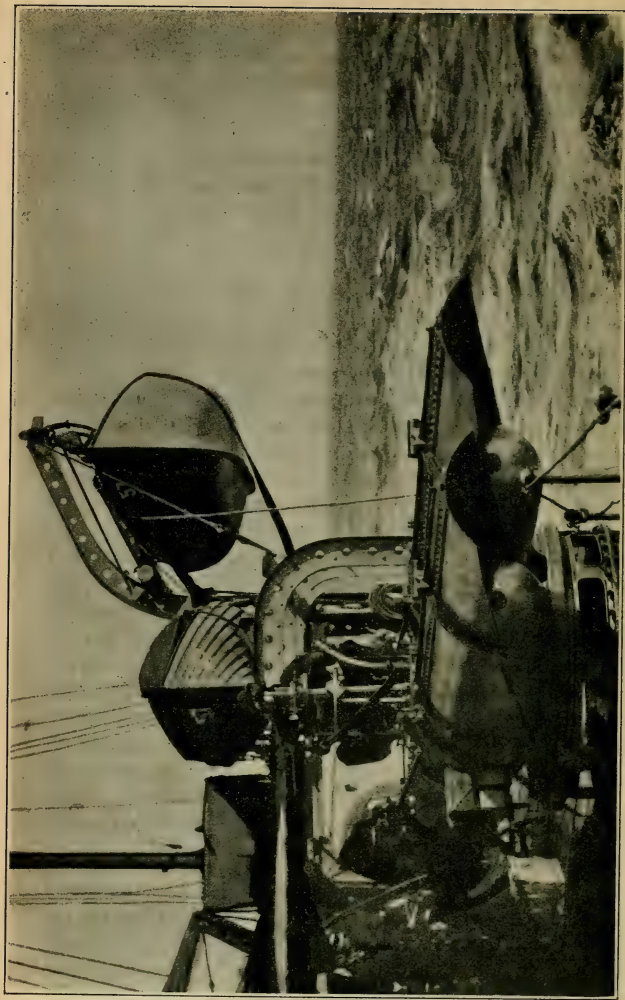
Commander Herbert was a quieter man, but genial and pleasant withal. He was one of the dare-devils of the British service. While a few of us knew it was he, on whose head the Germans had placed a special price on account of the Baralong affair, this was not mentioned. In addition, he had been through several narrow escapes on submarines. Admiral Bayly liked to

have such officers as Herbert serving under him. There was Captain Nasmith with the submarines at Berehaven, and, as soon as Captain Hyde left the *Adventure*, he was succeeded by Captain Gordon Campbell, the most successful and famous of the mystery ship captains. And it was not so very long before Captain E. R. G. R. Evans of *Broke* fame, and who was our liaison officer when the first American destroyers arrived at Queens-town, found himself under Sir Lewis Bayly's orders.

CONVOY EXPERIENCES

Our chief difficulty with the convoys at first was the keeping of the ships together in a reasonably well defined formation. There was always a tendency to straggle on the part of some. This was not entirely the fault of the deck officers, but often due to the fireroom and engine room forces. They were not used to steaming at an absolutely uniform number of revolutions minute after minute, and day after day. Some of the vessels of the convoy were making close to their maximum cruising speed, so when fires were cleaned the steam pressure dropped, and of course the speed was reduced, with the resultant falling behind of the ship concerned. The destroyers, at times, were kept busy rounding up the stragglers. In order to get a better viewpoint and to be in position to prod the laggards I always stationed my own ship, the *Wadsworth*, to cover the rear of these slow convoys. As we patrolled back and forth across the rear of the formation it was a simple matter to hail or signal any ship that was falling behind. The usual message was: "You must close up," and invariably the reply would come back: "We are doing our utmost." In fact on some ships which had the habit of lagging, we would get the reply before our message was sent. As soon as they saw our signalman *start* a message, out would shoot the answer: "We are doing our utmost."

If a ship lagged too far astern, I would have the *Wadsworth* pass between that ship and the convoy. This often had the desired result. The smoke would begin to pour out of the stack, and slowly but surely this "doing our utmost" ship would regain position. I often wondered in those cases what took place between master and engineer officer on the one hand, and the en-



U. S. S. "TUCKER"

Showing torpedoes in tube and method of securing boats at sea

gineer officer and firemen on the other hand. It was probably best illustrated in the old navy song which starts:

Oh, the Captain went below, and . . . etc.

During the early convoys the ships were widely scattered at daylight. The reasons for this were timidity on the part of those officers who were afraid of collision, and partly because the ships carried dimmed side and stern lights. At dark the ships would begin to open out and continue to do so, so long as the lights on the next ship could be seen. And these lights invariably showed farther than was intended. Gradually *all* lights were dispensed with, and it was found that the ships would then keep closed sufficiently to see the hulls of those next aboard. This was perfectly safe, especially after it became common practice not to zigzag during the dark hours.

Communications were a particularly difficult problem at first. Some of the ships carried only one radio operator, and no signalmen who understood the semaphore system. It was usually necessary in such cases to deliver a message by word of mouth through a megaphone. And this was not always easy when the wind was howling and a big sea was running. Often would the reply come back, "I don't hear you," when in reality was meant, "I do not *understand* you." At times there would be French, Italian, or Scandinavian ships sprinkled through the convoy. These often were a problem because sometimes they did not understand the English language. But we found out that while on most of these ships they did not understand *plain* English, they did have a working knowledge of good old English seagoing swear words. Commander Fremont told of his troubles in getting an Italian tramp merchant ship to understand a message. He tried international flag hoist, semaphore, radio, and megaphone; but all to no avail. Finally he ran close aboard and shouted through the megaphone: "You blank blank, blankety blank, when I hoist flag X you head south blank blank quick, savvy?" and without a moment's hesitation came the answer:

"All right, Sir!"

The signaling gradually improved with the placing of trained signalmen on every ship in the convoy, and, although the radio

communication never reached a really satisfactory state, still it worked in emergencies.

However, as time went on the whole conduct of these merchant convoys improved. With the assignment of men-of-war as ocean escorts, and the detail of "commodores" to all convoys, there was a decided advancement in station keeping, signaling, etc. Especially was this evident in certain inbound convoys which had been carefully drilled on the trip across the Atlantic. On one occasion I had charge of an escort of eight destroyers with a convoy of thirty-two merchant ships. The Admiralty considered the escort not of sufficient strength, so eight British destroyers were sent from Plymouth to re-enforce us. At my request the British destroyers took station as an outer screen. One of them sighted a submarine and made the warning signal. Without the least bit of confusion the convoy and escort, a total of 48 ships, turned simultaneously eight points right, and the danger was successfully avoided.

It was my good fortune not to have a ship of any merchant convoy of which I commanded the escort, torpedoed. At times submarines were sighted, but they were kept down without getting in a position for attack. In these early days of the convoy there were strict orders that no escort vessel should leave the formation to hunt submarines. Of course if a submarine was sighted, the nearer destroyers would go after it and keep it under until the convoy was well out of range. But the destroyer would then cease the hunt and rejoin the convoy. Later, when depth charge barrages were in order, this was changed so that if a submarine was located, the destroyer would continue the hunt until all possible chance of getting the sub was gone.

One dark night while the *Wadsworth* was patrolling across the rear of a slow convoy, the officer of the deck, Ensign N. P. Earle, shouted through the speaking tube: "Dropped a depth charge, sir!" Immediately afterwards as I was jumping up the ladder to the bridge the explosion took place, followed shortly by the explosion of the second charge which had also been let go. The officer of the deck had seen what he felt sure was the luminous wake of a submarine running submerged. It passed from our quarter to ahead as if the submarine were going to attack the convoy from the rear. Both depth charges being gone,

we circled looking for results. In a few minutes the radio operator through the speaking tube reported:

"*Trippe* reports striking a submerged object which listed her fifteen degrees." This of course was the submarine whose wake we had seen. Either our charges dropped close enough to shake him up or he was going ahead with his attempted attack when he unexpectedly bumped the *Trippe*. At any rate there was no attack on the convoy. A half hour later the radio operator reported hearing a German submarine fairly close aboard calling excitedly on the radio as if wanting help. Of course we could not decode the message, but were satisfied that this fellow had been sufficiently damaged to be making appeals for help to his next nearest confrère.

The detonations of depth charges near the ships of a convoy always gave them the impression that they were struck by something, and, until they were used to it, would so report to the escort vessels. Once in a while a ship would *think* herself torpedoed; and there were instances of their actually stopping and beginning to abandon ship by lowering boats, when the sole cause of their discomfiture was the explosion of a depth charge probably a half mile or more away.

While there was considerable monotony in the convoy duty, there were many things to keep one interested or uncomfortable. For example, there would be a machinery breakdown, necessitating the taking of the vessel in tow; or a ship would have its cargo shift leaving us to wonder whether or not she would turn turtle. If a ship was torpedoed there was the problem of picking up the survivors, or if the ship remained afloat, the problem of getting her into port. And of course we had a reasonable number of false alarms. I remember one case in particular where the escort destroyers were on a scouting line standing towards our expected inbound convoy. The atmosphere was unusually clear. Suddenly the masthead lookout reported:

"Conning tower of a submarine dead ahead."

We could not see it from the bridge, and shortly afterwards a rain squall in that direction shut out the horizon from view. The lookout was positive he had seen the submarine, so I sent radio to the ocean escort:

"Submarine sighted between the convoy and escort."



THE STERN OF THE U. S. S. "PORTER" "POOPED" BY A FOLLOWING SEA
Note the almost hidden depth charge

Shortly after this the rain squall passed by, and there, showing over the horizon, were the topmasts of the convoy which had for its ocean escort the auxiliary cruiser *Moldavia*. This was a large merchant ship with two smokestacks, and it dawned on me at once that what the lookout had mistaken for the conning tower of a submarine were the two smokestacks, almost in line, over the horizon. So I sent radio to the *Moldavia*:

"False alarm, lookout mistook smokestacks for conning tower."

The Commodore was evidently not pleased with the scare we had given him, and when we ran close aboard to deliver orders he shouted in a sarcastic tone:

"I congratulate you on your fine lookout."

Which remark I ignored by answering:

"I have the following orders for you from the Admiralty," and went ahead and gave him the orders.

We had our navigational difficulties. When proceeding to meet a convoy, it was necessary of course, that our position be accurately known at all times. This was difficult in view of the large proportion of cloudy and foggy weather which prevailed in those waters. Fortunately these poor visibility conditions did not often last long at a time. But there were occasions when twenty-four to forty-eight hours would pass by without getting a sight. When we once joined company with the convoy our navigational responsibilities ended, until we again separated. The Commodore of the convoy was responsible for its safe navigation. However, there were instances where the Commodore would call on the escort commander for his position.

An illustration of this happened when on one occasion we were presumably nearing the Smalls with a convoy composed of ships for Liverpool and for Bristol. There being no submarine activity in the Irish Sea, the convoy was to disperse at the Smalls. But we had been proceeding on dead reckoning for thirty-six hours, and the chances of sighting the lighthouse were slim indeed. The Commodore of the convoy signaled the *Wadsworth* requesting my position. So I directed all destroyers to take soundings and report their estimated positions. Taking the mean of all these as being as accurate as possible under the conditions, the result was sent to the Commodore. I also signaled, suggesting a change in course. The Commodore did not agree with the posi-



Navy Official Photograph

AT SEA IN ROUGH WEATHER

Note use of life line; this strap-hanging method was employed by some of the destroyers to good advantage

tion sent nor the suggested change, and so signaled. There was then nothing left for me to do but to remind him that *he* was responsible for the safe navigation of the convoy. While this interchange of signals was going on, we received a message from one of the Bristol ships. It was: "Please do not abandon us until we are able to ascertain our position." However, this appeal had to be ignored as so long as the lead was resorted to no ship should get into trouble. When I guessed we were off the Smalls, signal was made to the destroyers to return to Queenstown.

Under these conditions it was not so easy to find the Daunt lightship. Ordinarily navigation off the Irish coast is simple because the water is deep close to the headlands, and on these headlands are excellent sound signals. But on account of mines we were directed to keep at least five miles off all headlands. And in the Saint George Channel there were the same wind conditions that are found elsewhere in the foggy districts. That is, the on shore wind brought the fog, so that ships approaching the land were to windward of the sound signals which could not penetrate to a distance of five miles seaward.

When it was foggy, which was frequent, the destroyers would feel their way in as best they could. Sometimes we would pick up the gun signal on Ballycotton to the eastward, or the double gun on Old Kinsale to the westward. At times there were dead angles in these sound signals, and destroyers would run by the Daunt lightship fairly close aboard without hearing it, winding up dangerously close to the beach in Kinsale Harbor or some other place. On one occasion the *Wadsworth*, in a thick fog ran close aboard the Daunt lightship without hearing the fog signal. The red light on the mast gave the first intimation of our proximity to it. But once we were on our way for Queenstown we kept going until the "hole in the wall" was found.

As the fall progressed and winter approached the weather got worse and worse. That is, the percentage of strong winds, rough seas, and thick weather increased. My own personal experiences ended in the middle of November when I was detached from the *Wadsworth* and ordered home to command a new destroyer. But to show what the conditions were, and what the coming winter had in store for those who were destined to remain, it may be well to state my own experience during the last month of my stay.

During these thirty days the *Wadsworth* made three escort trips, each time taking out a convoy and bringing one back. The times required to complete these trips were eight days, seven days, and seven days respectively. Thus out of thirty days we were twenty-two at sea, and on eighteen of these days it was too rough to spread our mess tables.

During November the Queenstown forces began to be augmented by the addition of new destroyers. Prior to my departure for the United States, the *Duncan*, Commander Roger Williams, arrived, and as the *Bridge*, Commander Riddle, sailed out of the harbor on November 17, 1917, we passed the *Balch*, Commander W. S. Miller, and the *Downes*, Commander Allen Buchanan, standing in for the first time. From then on the force gradually increased in size until about June 1, 1918. Then Brest was made into a United States destroyer base, and the destroyers were approximately equally divided between these two places.

The thirty-five destroyers which operated out from Queenstown during the patrol period and the time of the early convoys, were a part of the old flotilla which had grown up under tutelage of the present Admirals Eberle, Sims, and Gleaves. Their personnel—officers and men—were well drilled and seasoned veterans. Our officer strength had been increased by the addition of that unusually fine body of young naval reserve officers who had volunteered their services, and who were the first to complete the strenuous three months' course at the Naval Academy. But now came the time to break up these excellent crews. There were a hundred or more new destroyers nearing completion. The Bureau of Navigation had no trained personnel to place on board them, so a cablegram was sent to Admiral Sims asking if he could help the Department out. Admiral Sims happened to be in Queens-town on the day this cablegram arrived. There were seven destroyers in port, and the seven commanding officers were organized into a board to make recommendations. We met in Captain Pringle's cabin at nine in the morning and sat continuously until five that evening, when the report was completed. The recommendations briefly summarized were: (1) that the Department should immediately begin sending to Queenstown a definite number of more or less inexperienced officers and men for distribution by the Commander of the Destroyer Force; (2) that

for each new destroyer to be placed in commission the Queenstown force would send to the United States a nucleus crew made up of an experienced commanding officer, one other experienced officer, and twenty-five experienced petty officers, seamen, and firemen.

The recommendations were approved, and the middle of November saw the beginning of the gradual disintegration of the destroyer crews when the *Bridge* sailed for home, having on board Commanders Johnson, Vernou, and myself, three junior officers, and seventy-five men, as the nucleus crews for three new destroyers. It was sad that this had to be done, but it was the only thing that could be done under the circumstances.

This method of organizing nucleus crews for new destroyers continued until the Armistice was signed a year later. The result was that when these first thirty-five destroyers to operate abroad finally sailed for home, there was hardly an officer and man left on them who had been in the original crews. But the greater part of them had returned to the War Zone and were operating out of Queenstown, Brest, or Gibraltar, on the new destroyers.

But there was a good side to this necessary turn-over in personnel. It gave just that many more officers and men the opportunity to operate from Queenstown as a base, and thereby see, as an object lesson for the future, as fine an example of sound organization, efficient administration, and excellent high command, as has ever existed anywhere.

From the uncertainty which at first prevailed as to the outcome of this experiment in co-operation between the naval forces of the two nations, there had developed a feeling of confidence which was well expressed by Admiral Bayly's order to all the ships of the station issued in September, a little more than four months after the arrival of the first destroyers. This order follows:

Admiral's Office, Queenstown,

No. W. 102-A.

11th September, 1917.

MEMORANDUM.

The Commander-in-chief wishes to congratulate Commanding Officers on the ability, quickness of decision and willingness which they have shown in their duties of attacking submarines and protecting trade. These duties have been new to all and have had to be learned from the beginning and the greatest credit is due for the results.

2. The winter is approaching with storms and thick weather; the enemy shows an intention to strike harder and more often; but I feel perfect confidence in those who are working with me that we shall wear him down, and utterly defeat him in the face of all difficulties. It has been an asset of the greatest value that the two navies have worked together with such perfect confidence in each other and with that friendship which mutual respect alone can produce.

LEWIS BAYLY,
Vice Admiral,
Commander-in-Chief.

The Commanding Officers,
U. S. Ships *Melville* and *Dixie*;
H. M. S. *Adventure*;
and all U. S. Destroyers and H. M. Sloops
based on Queenstown.

(To be concluded)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

WILL HISTORY REPEAT ITSELF?

BY MAJOR EDWIN N. McCLELLAN, U. S. M. C.

The old Biblical maxim that, "there is no new thing under the sun," is illustrated by the present efforts through proposed legislation to combine the Navy and War Departments into one Department of Defense.

The American Revolution was fought and won by an Army and a Navy administered by Congress through two separate Departments. The Navy and the Marines were practically disbanded at the close of the Revolution. Toward the close of the Revolutionary struggle—after the Naval Committee, Marine Committee, and Board of Admiralty had in turn administered naval affairs—Congress, on February 7, 1781, resolved to have a "Secretary of Marine" and prescribed his duties. Major General Alexander McDougall was selected to fill this newly-created office but the conditional acceptance of that officer was refused by Congress and the office was never filled. Naval affairs were then administered in turn by the Board of Admiralty, the Superintendent of Finance, and the Agent of Marine. Robert Morris filled the latter office until November 1, 1784, after which date the office remained vacant. The Board of Treasury, aided by the Commissioner for Settling the Marine Accounts, and by the Secretary to the Agent of Marine, wound up the business of the Navy of the Revolution. By 1785, the last ships of the Continental Navy had been disposed of. While the Articles of Confederation authorized the building and equipping of a Navy, no effort was made to take advantage of that provision at any time after 1785.

On January 27, 1785, Congress prescribed and outlined the duties of the Secretary at War, but no reference was made to naval matters.

Upon the adoption of the Constitution in 1789, Congress in April of that year, established an Executive Department, known as the Department of War. This was the Department of Defense because it administered all affairs relative to Navy and Army matters. The Secretary for the Department of War, among other things, conducted all affairs relative to "naval forces, ships" and all such other matter respecting "naval affairs, as the President of the United States shall assign to the said department." Thus, the administration of those affairs, which at the present time are conducted by the Secretary of the Navy, were administered by the Secretary for the Department of War. He acted in the dual capacity of Secretary for the Army and Secretary for the Navy. Since the Navy and the Army are the two principal arms by which war is conducted it was quite natural that they should be placed under a *War* Department; but when the Navy was taken out of the Department of War in 1798, the name of that department should have been changed to a name less inclusive—such as the Department of the Army, or some other appropriate title.

This Department of War conducted all the national defense affairs from 1789 until the summer of 1798. During this period several matters of importance with regard to the use of an Army and a Navy as instruments of national defense arose. There were: Shay's Rebellion, the Whisky Rebellion, Indian troubles, etc., at home; trouble with the Barbary Powers in the Mediterranean; possible trouble with Great Britain; and decided friction with France. Our two quasi-rebellions and other domestic troubles of this nature were easily quelled; a treaty with Morocco in 1787 removed causes of war; hostilities with the Algerines were obviated by the famous Bribe-Treaty of 1795; the Jay Treaty of 1796 smoothed out temporarily our British troubles; a "no tribute" treaty with Tripoli became effective in 1797; peace with Tunis was assured by the Treaty of 1797-99; but the friction with France eventually ended in a naval war with that country and caused the division of the War Department into two separate executive departments—one to administer affairs of the Army and the other those of the Navy.

After vainly struggling with these various problems for nearly ten years, the serious difficulties with France brought Congress

to contemplate the inadequacy of the Departmental machinery to administer properly national defense matters. Of course it was a more or less simple thing for the Department of War—or as it now may be called, the Department of Defense—to conduct both Navy and Army affairs when they were insignificant in importance and no war-clouds were on the horizon; but when war seemed imminent, a reorganization became imperative.

Having successfully experimented with separate departments during the Revolution, Congress placed all national defense matters under one Department in 1789, as has been described. The real reason for this change was a desire for economy. War seemed far off—even beyond the possibility of ever happening again. The spirit of the times was that of liberty, equality and fraternity. The American and French Revolutions had been expressions of these ideals. The sentiment in Congress, reflecting that of the people, was to eliminate, or at least reduce to a minimum, everything military. Many believed it would be better to bribe pirates than to fight them—if it were cheaper to do so. Therefore, it would be neither economical nor necessary to have more than one department to handle national defense matters. But when hostilities with the French became a probability a more practical spirit expressed itself in Congress.

Now here is what happened and how it happened. On March 8, 1798, Mr. Sewall's Committee of the House reported to Congress that a better economy might be introduced into the Department of War by establishing in that Department some officer who should be employed in the immediate superintendence of the naval concerns of the United States. This conclusion of the committee was followed by a recommendation that there be established in the Department of War, a Commissioner of Marine who should have charge of all naval matters intrusted to him according to law. If adopted, this recommendation would result in one super-executive department with at least two sub-divisions—Army and Navy—with a probability of more when conditions called for them.

After mature and serious consideration of this suggested plan, Congress emphatically refused to adopt it, and on April 30, 1798, established the present Navy Department. In thus separating the Navy and Army, Congress, of course, should have prescribed

that the department administering the affairs of the Army be denominated the "Department of the Army" or some other proper title, rather than to have left it with the ambiguous title of the "War Department."

And so, through trial and corrected error, Congress finally concluded that the best plan was to have separate executive departments to administer the affairs of the Army and the Navy. It had tried and abandoned the method of having all matters relating to war or national defense—whether on land or sea—conducted by one department. It had considered and rejected the suggestion that naval affairs be conducted by a Commissioner of Marine acting under the Secretary of War. The question now is—will history repeat itself?

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

LETTERS OF A RETIRED REAR ADMIRAL TO HIS SON
IN THE NAVY

BY REAR ADMIRAL A. P. NIBLACK, U. S. NAVY

LETTER No. II

FRENCH MOROCCO, THE COLONIAL MIRACLE

Hope Farm,
Long Island, N. Y.,
Dec. 1st, 1922.

Dear Son:

I am very glad that you are benefiting by the Department's policy of sending destroyers abroad for their shaking down cruise. It helps to make good on the enlistment posters and enables officers and men to get their "plimsol mark" sewed on for "full load" for both fresh and salt water. The Navy had a chance to try prohibition in 1914 before the public did, but the country that has been hardest hit by prohibition has been France, as the wine industry in France and her colonies has suffered a hard blow at the hands of Mr. Volstead and Mr. High-Cost-of-Living.

I was more than pleased to get your letter from Casablanca and to know that your commanding officer had taken you with him on his official visits. I have a real and abiding interest in French Morocco. Some years ago I met an American dentist who, when just out of college, with a bunch of instruments in one hand and his future in the other, took the contract to fix the teeth of the Sultan of Morocco at Fez. He landed at Tangier through the surf, and, after some delay, joined a caravan that took seven days to Fez. The camel made him seasick and every night, in camp, he expected to be attacked by bandits. Arriving at Fez, he crawled in on his hands and knees to meet the Sultan

and, in the subsequent proceedings, between a desire to please and a fear of causing pain, he managed to escape imprisonment and got a fee that made him feel like a war-time plumber. Some time later when I told this dentist that I had motored from Tangier to Fez in twelve hours, he was as much interested as he was in what I told him of the miracle which the French have wrought in the country itself. As Colonel, then General, and now Marshal of France the great Lyautey has given to the world an example of colonial development and administration such as it has not yet seen elsewhere. It is such a marvelous thing that the only question is can any successor keep it going along the same lines?

I was particularly glad that you went to Rabat with your Captain and met this great man and his charming wife. He himself says that he is but an humble pupil of the late General Gallieni, with whom he served in Madagascar and Cambodia. His conquest of Morocco, in our own day, reads like a romance but also sheds side lights on the methods by which countries, inhabited by backward peoples, have been exploited by the more civilized nations.

Algeria became French in 1830, and, on the 3d of June, 1883, France assumed a protectorate over Tunisia, much to the discomfiture of Great Britain and Italy. The boundary line between Algeria and Morocco, while geographically delimited, was effective through the raiding of Algeria by wild tribes of Berbers across the boundary from Morocco. About this time Delcassé had begun secretly to intrigue for the possession of Morocco, and Colonel Lyautey, then a cavalry officer in Western Algeria, came into the spotlight in 1903 by entering Morocco at the head of French troops and occupying a number of important posts in Eastern Morocco, such as Talzaza, Martarka, and Berguent. England, Italy and Spain were quite restless under this invasion and advance, and, as a result of diplomatic protests and representations, various treaties were entered into with regard to Morocco, which I told you about recently; one between England and France on April 8, 1904; and one between England and Spain on October 3, 1904. There was also, on September 1, 1905, a treaty signed between France and Spain which contained secret clauses with regard to Morocco. Germany was quite restless

under the growing colonial power of France and particularly under this advance of General Lyautey. Germany desired to be consulted and the theatrical visit of Emperor William the Second of Germany to Tangier in April, 1905, led up to the Algeciras Conference, signed on April 7, 1906, which seemed to internationalize Morocco and establish all countries on an equal footing (except that the secret clauses in the three treaties alluded to were not known by non-participants). This may be said to close the first step in the French acquisition of Morocco.

Germany began to intrigue politically in Morocco through her consuls and commercial agents and managed to stir up sufficient bad feeling in Marakech, the old Moorish capital, to lead to the assassination of the French Doctor Mauchamp on March 19, 1907. Fortuitously this started France on its second step in Morocco. As a protest General Lyautey occupied Oujda, in Eastern Morocco, on July 31, 1907. Owing to German intrigues at Casablanca and subsequent rioting, eight European laborers were killed. These laborers were engaged in harbor work under a concession which the French had secured from the Sultan. As five of the laborers also fortuitously were Frenchmen, the French cruiser *Galilee*, on August 5, bombarded the town and landed her battalion. On August 7th General Drude landed with 3,000 French troops, General Lyautey meanwhile operating in Eastern Morocco, secured the submission of 30,000 Berbers in that region. French troops, landed at Casablanca, completed the occupation of the district surrounding Casablanca known as Chauouiaa and General Lyautey was sent on a military mission to the Sultan. Immediate pressure from Germany prevented further expansion at this time, and this may be said to have ended the second step of the French advance in Morocco.

It is a curious fact that, owing to the Madrid Convention and the Algeciras Conference, the Sultans of Morocco had each, in turn, done away with their armies because they were protected by international agreements and jealousies. What troops they had were only for use against wild tribes, and thus the Sultans were ill prepared to resent either European aggression or domestic revolts. Pacifism is usually an invitation to get kicked. In 1911 the Sultan Abdul-Aziz, that charming gentleman now in exile at Tangier and with whom I have several times dined and

played golf, was besieged in Fez by rebels under his brother Mouley Hafid and both, in turn, called in the French troops from Casablanca to help them. These French troops promptly occupied Rabat, Mekinez and Fez as well as the country surrounding these three important cities. This brought about the famous protest from Germany by the gunboat *Panther* which anchored in Agadir on July 3, 1911, and which nearly brought about a war with Germany. However, on November 4, 1911, both countries signed an agreement by which Germany was given compensations by France in the French Congo and she then consented to a French protectorate over Morocco. This practically tore up the Algeciras Pact as far as Germany was concerned. England, France and Spain figuratively tore it up before it was signed. We alone are still holding the scraps of paper. The ink was barely dry on the Franco-German agreement when *Le Matin*, of Paris, published the secret clauses of the French treaties and German indignation knew no bounds.

As the visit of the German Emperor to Tangier had brought on the Algeciras Conference, so the visit of the *Panther* forced the hand of Great Britain to the extent that it really brought about the Entente, for Great Britain came out flatly against Germany obtaining territorial influence in Morocco, and this backed up the French protest strongly enough to convince Germany that any further intrigue in Morocco was futile. Questions asked in the British Parliament about this time disclosed the fact that Great Britain was prepared to support France, foreshadowing her coming into the war in August, 1914.

On March 30, 1912, the Sultan, Mouley Hafid, signed a treaty accepting the protectorate of the French over Morocco. General Lyautey arrived in Morocco on the 24th of May, 1912, to become French Resident General of Morocco. During his journey to Fez a revolt had occurred in Fez which cost the lives of sixty-eight Europeans, but General Lyautey boldly entered the city. A second revolt occurred the first hour after the arrival of General Lyautey in Fez, who promptly charged Mouley Hafid with being the instigator. The latter abdicated on the 12th of August, 1912, in favor of his brother Mouley Youssef, the present Sultan. The same day a revolution broke out in Marakech when the Pretender (El Hiba) proclaimed himself Sultan, oc-

cupied Marakech and took all Europeans prisoners. General Lyautey and the famous General Mangin drove out El Hiba and thus added another large section of territory to their holdings. In 1913 the French consolidated their gains in territory by active campaigns against the opposing tribes, and early in 1914 pierced through from Taza to Oujda, thereby joining Eastern and Western Morocco. On May 17, 1914, General Lyautey entered Taza at the head of two columns of troops which had been operating separately under General Gournod and General Baumgarten, and which had then made a junction. Active operations were carried on against hostile tribes in the Atlas Mountains and there was continually active fighting on all the borders north, east, and south, when suddenly the World War began in August, 1914.

Morocco as it was at the time of the Madrid Conference in 1880, in which we participated, was later partitioned into three zones. The Spanish zone extended two hundred seven miles on the Mediterranean coast embracing about ten thousand square miles of territory, with a population of about one million. This territory, however, did not include the internationalized city of Tangier, which has a hinterland of one hundred forty square miles. The Spanish zone has always been and still remains a lawless region inhabited by the fierce tribes of the Riffs.

The story of how General Lyautey saved Morocco during the war is a thriller but what I have been telling you must give you a headache. However, if you have a sense of humor, European diplomacy will not make you dizzy. Out of all the intrigues over Morocco, England got rid of France in Egypt and settled all of her outstanding differences with France; Spain got a "red-hot stove" on the Atlantic Coast of Morocco; Italy got a free hand in Tripoli; German intrigue in Morocco failed and she got some prickly heat territory in the French Congo; France got a rich territory almost as large as France, with 6,000,000 inhabitants; and the United States got a lesson, which is probably one of the reasons why we hesitate a bit over entangling alliances and agreements with groups of European Powers. France had experience in Algeria so that in Tunis and Morocco she has established a protectorate instead of a colony, in which she shares her power with the Bey and the Sultan and lets the native offi-

cials rule. General Lyautey has shown admirable tact in all he has done. Everything has been avoided which could wound the religious susceptibilities of the people; the old native arts, almost forgotten, have been revived; and the Mederas, or religious schools, alongside the great mosques, have been restored to their former splendor. Every act and thought has been influenced by a desire to ameliorate the condition of the people and to teach them modern methods of agriculture. Endless roads have been built and hospitals and dispensaries have been opened throughout the more settled regions. General Lyautey himself has been declared to be a "Defender of the Faith." His boundless and untiring energy has exacted from his subordinates a loyalty with nothing of resentment in it. He has done everything to preserve the native cities intact and to compel Europeans to live in separate communities outside the native cities. In every way the French rule has been made tolerant and gentle and the country has been blessed with a security it has never known before.

General Lyautey was in the midst of his great work when the crash came in August, 1914, and ruin stared Morocco in the face. The French Government lost its head and immediately ordered the withdrawal of civilians and troops to the coast towns. General Lyautey protested and then performed a miracle which is one of the epic chapters of history. By his audacity he saved Morocco for France. He had 80,000 regular French troops, of which he promptly sent 40,000 to France, replacing many of the men in the remaining 40,000 by territorials from France who, on account of their age, were considered unsuitable elsewhere. French native units were formed and drafted to France and immense supplies of grain and food stuffs were shipped to the Mother Country. Throughout the War, without relief and without rest, he continued to fight the wild tribes along the borders, north, east and south, which tribes were helped, reinforced and paid by Germany and German agents. The native Chiefs who were most dangerous and who fought longest were Salem, Malek, El Hiba and our old friend, Raisuli. General Lyautey organized, trained and sent to the front in France over 30,000 native troops and furnished endless supplies of grain, meat, horse, mules and military supplies in general. He

found time to organize agriculture; to establish stock and breeding farms; to undertake irrigation works; to construct roads; and to show no signs to the natives that France was in any way anxious about the outcome of the war. Many of the native chiefs in the mountains remained loyal to the French but others were kept supplied with money and arms by German submarines and, through Spain and Spanish Morocco, German agents were able to work undisturbed.

It is a curious fact that it took a great war to awaken the indifferent French people to the value of their colonies, and, at this moment, threatened almost with national bankruptcy, France is still able to pour money into her colonies to consolidate her vast colonial empire, second only to that of Great Britain.

Morocco, out of 36,000 square miles of arable land in the 160,000 square miles controlled by France, has 8,300 square miles under full cultivation, producing wheat, barley, oats, corn, millet, flax and hemp. The vast pasture lands teem with flocks of goats and sheep, and herds of camels, horses, mules and swine. Rich deposits of phosphates have been discovered, oil fields are being developed, and vast veins of iron ores exploited. The railway from Fez to Taza was opened on July 31, 1921, connecting Morocco with Algeria and Tunisia by rail. The Atlantic Coast of Morocco has no harbors, but artificial ones are being constructed at Casablanca, Kenitra, Agadir, and Mogador. At all these coast ports are evidences of the Portuguese occupation about the time of the discovery of America, and yet this was a modern incident in the history of a country whose sultans have reigned since 788 A. D. The Carthaginians overcame the native Berbers in earlier days and were afterwards driven out by the Romans, whose city of Volubilis stands today as well preserved as Pompeii. It was the far flung city of the Roman Empire and was destroyed by the Moors en route to the conquest of Spain. In sight of the ruins of Volubilis, which are near Mekinez, in the interior of Morocco, stands the first Moorish city, Moulay Idris, built on the topmost pinnacles of twin mountain peaks, where the Sultans first established their sway. Today the Sultan is theoretically an absolute monarch but is really limited by having French ministers of foreign affairs and of war, and financially controlled by limitations which have made the Moors a prosperous people.

France has shown that she knows how to share power. She has truly learned what to adopt and what to avoid in colonial administration.

Financially Morocco has its own budget and France only meets the expenses of its troops of occupation. What it has cost her to pacify the country has been all that she has had to pay, and from 1907 to last year the cost of pacification did not exceed 1,100,000,000 francs, the rest of the total of 2,448,840,000 francs has been the cost of garrisoning Morocco, and has been borne by her people. The estimated yearly expenditures now are a half billion francs, of which one-half is borne by France as the cost of garrisoning.

Mr. W. R. Thayer, in his *Life of Theodore Roosevelt*, states that by direct appeal to the German Emperor he persuaded Germany to refrain from an open quarrel with France in 1905, and instead to enter the Conference of Algenciras. Others claim that it was the German Emperor who persuaded President Roosevelt to send delegates to this conference. The fact remains that our treaty rights in Morocco have been as important as those of any other country in the world and we have not yet renounced any of their stipulations. Mr. Roosevelt renounced the "shirt sleeve" policy in favor of "tread softly and carry a big stick." Our present policy is "watchful waiting."

Our Monroe Doctrine is working in the Western Hemisphere and there bids fair to be one some day in Asia, but Africa is now almost entirely parcelled out among the European Powers. We have kindly held the bag.

You asked me in your last letter if I am really in earnest about being a farmer and if farming pays. I want to be a farmer because I have been a consumer all my life and favor the idea of being a producer to even it up, but the principal thing I have been able to raise on the farm so far is a mortgage. That is doing quite as well as most farmers and most governments are able to do these days. I am glad to see there is a farmers' bloc in Congress as it is about time there was less truckling to over-organized labor and more sane relief of the agricultural crisis. I am doing what all governments are now coming to after the "jag" of war, reducing expenses and studying efficiency.

The financial problem France is facing is one of the most in-

teresting in Europe and I will tell you about it sometime. If she is able to put over what she is now trying to do she will remain a first-class power. Civilization owes France a great debt of gratitude and, if there were not so much propaganda going on in the world, we would realize it more fully in this country.

Affectionately,

DAD.

LETTER No. 12

THE COLONIAL POSSESSIONS AND COLONIAL
POLICY OF FRANCE

Hope Farm, Long Island, N. Y.

January 1, 1923.

Dear Son:

A Happy New Year to you! I have just received your interesting letter from Gibraltar enroute to Oran, Algiers, Bizerta, Tunis, Malta, and the Near East. A cruise in the Mediterranean may mean very much or very little, according to what you are interested in. From an amusement point of view it is diverting; from a tourist point of view it is fascinating; from a political point of view it is in a ferment; from a historical point of view it is filled with the ruins of past empires that, in their day, seemed as stable and enduring as our country does now. From a commercial point of view the Mediterranean is the most important waterway in the world which, however, it took the World War to demonstrate, just as, through the inauguration of the convoy system in 1917, Gibraltar suddenly became the greatest port in the world and a base for our own and Allied men-of-war as escorts for the convoys.

You tell me that you saw Mr. Sprague, the American Consul at Gibraltar, who is as much a part of the Rock as the famous "galleries" themselves, for, with his father and grandfather before him they have held the position of American Consul continuously at Gibraltar for over ninety years and I am hoping to attend the one hundredth anniversary. There are no signs now at Gibraltar of the American occupation in 1917-18 when we had forty ships based there. I fear that evil days will fall on the

fortress as modern long range artillery, airplanes and submarines will convert it into an historical museum and a mere port of call—for no land force can now guarantee its security but only the British Fleet.

The Rock was one of the "Pillars of Hercules," Monkey Hill across on the African coast being the other, and between them they marked the boundaries of the known world. The countries bordering on the Mediterranean were the cradle of civilization and its waters have been reddened with the blood of many naval battles fought for empire as Egypt, Phoenecia, Greece and Rome have risen, in turn, to be the center of art, learning and progress, only to finally fall before the Vandal and the Turk. The Turk afterward, for almost two centuries, dominated two-thirds of its entire coastline and, only in our day, has he been despoiled of much that remained of the empire which was greater than that which any other power has been able to hold on its shores. The Turk himself is far from being a vandal except in the newspapers for political, religious and fund-raising propaganda. In our day the French have profited most territorially at the expense of the Turk. France theoretically dominates the Mediterranean but practically Great Britain does.

That is why the French were so disappointed at the Washington Conference as the aspirations of their navy were for a 5-5-3-3 policy with Italy 2 or less. Their delegates, apparently, did not represent the real views of the French people and France on a par with Japan represents more the relative importance and necessity of sea power to the countries concerned. France faces on two seas and has a vast empire less than twenty-four hours across the Mediterranean. While it is true that she is financially unable to maintain a navy in proportion to her desired share, she has been deeply wounded in her national pride by being disrated as a first-class naval power. Moreover, France looks to her colonies for additional man-power to supplement her dwindling military population at home. Local control of the sea is, therefore, essential to her utilization of the man-power and resources of her African empire, and that is why France insisted on submarines at the Washington Conference: to guarantee and guard in time of war her convoys from Africa.

France is proud of her colonial empire second now only to that of Great Britain, but it took the war to really reveal resources to her and she is now beginning to realize that her future salvation lies in her colonies. This is why the President of France, last year, made a tour of the North African provinces and that is why today France stands face to face with a great financial problem almost as large as that created by the war itself. In the war the native troops came forward by thousands to fight, not as colonials but as Frenchmen, and it is an unquestioned fact that France treated her colonials in the war as Frenchmen. The French population, in ten years, 1911-21, has fallen off 2,200,000 but Alsace-Lorraine has restored the balance. The influx of Italians in the southeast, of Spaniards in the southwest, and of Belgians in the northeast has added about 300,000 a year to the increasing tide of foreign residents, but, for all that, the population of France today is only 39,000,000 and is still steadily dropping at an astonishing rate. Yet in the fifty or more years since the Third Republic came into being on November 11, 1870, France has added to her colonial possessions 50,000,000 inhabitants and an additional area eighteen times greater than that of France itself. Her North African possessions, in particular, have proven to be a great reservoir of man-power and economic resources. In the first year of the war, all her colonies together furnished 107,000 soldiers. Between 1914-19, her Asiatic and African colonies freely and spontaneously offered 690,000 soldiers, two-thirds of whom came from North Africa, and of that total 250,000 fell in battle. In addition to this nearly 1,000,000 native colonials worked in France as factory hands, stevedores and long-shoremen. In a material way, from the first to the last day of the war her colonies sent her 2,000,000 tons of grains, oils, fats, grease, meats, wines, timber, phosphates, and ores.

We all know of the French West Indies and French Guiana, with its Devil Island, which she acquired in 1635, with a total area of 33,200 square miles and a population of 500,000. We also know of New Caledonia and Tahiti in the Pacific and the French Asiatic possessions are equally well known. They are French India, acquired in 1679; Cochin-China, 1861; Cambodia, 1862; Annam and Tonking, 1884; and Laos, 1892, all with a total

area of 250,000 square miles and a population of over 17,000,000.

The following list shows the immense empire which France has carved out of Africa:

<i>Africa</i>	<i>Area in Square Miles</i>	<i>Population</i>	<i>Date of Acquisition</i>
French Morocco	220,540	5,400,000	1912
Algeria	222,580	5,563,828	1830-1902
Sahara	1,544,000	800,000	—
Tunisia	50,000	1,953,000	1881
Senegal	74,112	1,204,113	1637-1889
French Sudan	617,600	2,200,975	1893
Upper Volta	154,400	3,000,100	1893
Guinea	95,218	1,851,200	1843
Ivory Coast	121,976	1,407,030	1843
Dahomey	42,460	860,590	1893
Mauritania	347,400	240,144	1893
Military Territory of Niger...	347,400	700,225	1912
Congo	779,270	10,000,000	1884
Reunion	970	174,000	1649
Madagascar	228,000	3,512,690	1643-1896
Mayotte	790	97,000	1843
Somali Coast	5,790	208,000	1864
	<hr/> 4,853,506	<hr/> 39,172,895	
<i>Mandate Territories in Africa</i>	<i>Area in Square Miles</i>	<i>Population</i>	<i>Date of Acquisition</i>
Cameroon	166,489	1,500,000	1919
Togo	21,893	500,000	1919
	<hr/> 188,382	<hr/> 2,000,000	

In general, the colonial policy which France has employed to solidify her empire has been a straightforward and liberal one, that of associating natives in the government to the greatest extent practicable. With this she has embodied three essentials: (1) Medical assistance, (2) Education, and (3) Justice. The medical assistance is unusually well organized, practical and far-reaching. The education has, on the one hand, been left sufficiently in native hands to preserve their traditions, but the higher schools and associated trades schools have been controlled by the French representatives. Organized justice has given to the natives what they have never known before: the free and peaceful enjoyment of what belongs to them. This last is the decid-

ing factor in native acceptance of French domination. She has organized thousands of dispensaries, thousands of schools, and has striven hard to cause the decisions of impartial judges to be respected everywhere. Of course, there are French courts to try European cases and the capitulations have not been entirely done away with.

Meanwhile, individually and economically, all of the French colonies require additional railroads, re-equipment of existing lines, additional telegraph lines and wireless stations, extensive harbor works, irrigation, roads, bridges, wells, mining machinery, shipping, public buildings, and other things required for the development of the inexhaustible resources which hold in their hand the future greatness of France. Left to local taxation it will take over fifty years to raise the necessary money. To realize it properly in this generation will require billions of francs advanced by France itself, but the salvation of France, economically and in man power, depends upon her raising these billions somehow. In addition to this she has incurred a great debt for the rehabilitation of her devastated regions. On top of this her projected naval program for the next twenty years calls for an annual appropriation of 300,000,000 francs. Unfortunately France has felt called upon to maintain an army of over 750,000 men ever since the armistice. You should know this before you fall in with the French so that you can understand the great problems which confront them.

I am glad, and you should be also, that you were made to learn to speak French fluently when young. Learning a language after childhood requires patience and almost continuous effort. While there may be such a thing as unusual talent for learning languages, if you dig for it and plug for it and plug along it will stay with you forever. A little language is a dangerous thing as it only brings complications, but, up to the right point, it opens up to you new literature, new ideas, new points of view, and makes you a citizen of the world instead of a local issue. Curiously enough, from a purely commercial standpoint fluency in languages, and nothing else, only qualifies you to be a porter in a hotel or a courier for travelers. As an adjunct to a liberal education, however, I know of nothing so distinguished, so humanizing, and so helpful to one's self-respect as a knowledge

of modern languages, and I hope you will not be contented with only French and Spanish.

You are going to fall in with French ships and French army officers in the Mediterranean and everywhere you will experience their frank, open and publicly-expressed gratitude for the aid we brought to them at the critical period of the war in turning the tide. They admit it, they acknowledge it, and they want us to know it. Our Army in France got a different impression at first, but that was because we did not express our appreciation of their courage and suffering during the three years before we came into the war and, by occasional boasting, made them sore. The discipline among the French colonial troops is admirable and the attitude of the officers towards them is charming in its simplicity and paternalism. The discipline in the French Navy is also improving by leaps and bounds. When the war came on, in 1914, the French Navy had not entirely recovered from the evil days of M. Peletin and after the armistice the war-weary personnel was much reduced in morale. Within the last two years it has regained its elasticity, its smartness and its gunnery efficiency. Its ships are as smart, clean and well-disciplined as any you will see. Unfortunately, France's army of over 750,000 men, which she has maintained ever since the armistice, has proven a drain on her financial resources and precluded any considerable expenditure on her navy. It has brought against her the charge of militarism. The plain fact is that France stands in a very perilous position politically and financially. Politically almost isolated, she is without guarantees against any assaults on her life similar to those of 1870 and 1914 and she is sailing close to the breakers financially. This is important to you only as opening your eyes to the real facts. France needs the financial assistance of French and foreign capital and enterprise in the development of North Africa. This is the best guarantee of France's future financial stability, for she will be rich again in time, especially if she is guaranteed against a third attack by Germany. This is a problem for statesmanship if not for friendship.

The problem of population France is solving in her own peculiar way. The French have no color line and readily mix with the natives of all colors. The French citizens in Algeria,

native and naturalized, have increased seventy per cent in twenty years, now numbering 830,000—four times the alien white residents. By the terms of the French naturalization law of 1889 whoever is born on French soil, of one or both parents also born there, is legally French. In Algeria the residents of Spanish and Italian descent largely outnumber the French. In Tunisia there are 85,000 Italians as against 55,000 Frenchmen, and these Italians have special treaty rights as regards schools, associations and citizenship, but there is grave friction growing over the citizenship question of the Italian and Maltese population. With only 45,000 French colonists in Morocco, and a large influx of foreigners attracted by business opportunities, a new problem will arise in that country. The French people do not readily leave France to settle permanently in the colonies and even the officials on duty in the colonies make frequent trips back to France. The large French population in Algeria is due to the fact that after the war with Prussia, in 1870, French citizens of Alsace-Lorraine were given special encouragement to migrate there. At the bottom of the low French birth rate is the French law of inheritance. The French people are tenacious of their ancient customs but the war has profoundly influenced the French and new impulses are stirring in the country.

Affectionately yours,

DAD.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE SPIRIT OF THE OFFENSIVE¹—III

BY LIEUTENANT H. H. FROST, U. S. NAVY

XVIII. OFFENSIVE STRATEGIC OPERATIONS

The secret of all offensive strategic operations lies in Moltke's motto: "First weigh, then venture."

This is true despite the fact that some great soldiers have been noted for the fact that they have given little consideration to planning or to weighing the situation. They won victories and campaigns through their very impetuosity and tremendous driving power. Blucher was the perfect type of such a general, and one of the most successful. Ney was another, but he was never successful in an independent command. "Fighting Joe" Hooker in the Civil War was a third.

At first glance one might be tempted to place Suvorof in this class. It is true that he apparently never made a plan on the battlefield, but the instructions issued by him from time to time show that he had planned out in advance an almost inflexible system which was well designed for the conditions under which he fought. In all his early campaigns he was opposed only to Turks and Poles, and in his Italian operations he usually had superior numbers, and the enemy commanders were not of a high order. Despite his great daring and apparent recklessness, he was always successful and therefore his methods merit a careful study, because they would again be effective against an enemy over which we have a marked ascendancy. They were accordingly followed with complete success by Cortez in Mexico, Pizarro in Peru, and the British in the Indian mutiny.

The strategical doctrine published by Suvorof may be seen in the following paragraph: "This quickness doesn't weary the men. The enemy doesn't expect us; reckons us 100 versts away; and

¹ Commenced in issue of December, 1922.

if we are a long way off to begin with, suddenly we're on him, like snow on the head; his head spins. Attack with what comes up, with what God sends."

A remarkable instance of this method was afforded by his conduct the first day of the Battle of the Trebia. His Russians came on the battlefield, from which their allies the Austrians were retreating, after having made a march of fifty-three miles in thirty-six hours in the hot Italian weather, to which they were little accustomed. "At four o'clock," writes Blease, "the Russian grenadiers marched on to the field. So great was their effort that Bagration, begging for a short rest, declared that the companies which left Alessandria 100 strong, now contained, on the average, forty men each. 'Only forty to a company?' exclaimed Suvorof, 'Macdonald will have only twenty. Forward, victory.' "The fiery old field marshal galloped along the front, shouting, 'Forward, forward! Cut them down, smash them!' The tired Russians then drove the French from the field at the point of the bayonet."

While Suvorof's methods would today be effective against a very inferior class of opponents, it will usually now be necessary to have a more flexible system. A permanent scheme of operations cannot be made long in advance, but a plan suited to the situation at the time must be made.

Hannibal's invasion of Italy was as daring an operation as was ever carried out, but it was based on a carefully weighed plan, which richly deserved success. When Cæsar advanced on Rome with but 5,000 men, he concluded that speed and time were more important than a large army, and the result justified his carefully considered plan of operations. Before Alexander invaded Persia, he had been studying the situation and collecting information for years; all his campaigns were based on methodical plans.

When Frederick forced the Austrians to fight at Leuthen, when he was inferior in the ratio of one to three, he was deliberately risking his kingdom on the chances of a single battle. That his example was remembered by the Germans in the World War is shown by an inspiring statement by Hindenburg: "When a commander on the battlefield throws in the last reserves he is only doing what his country rightly demands of him. He accepts full responsibility and finds the courage to take the last decisive step

without which victory cannot be won. A commander who cannot or will not dare to stake his last resources for the sake of victory is committing a crime toward his own people. If the blow fails he is certain to have the curses and scorn of the weaklings upon his head! That is always the fate of soldiers. To act only on absolutely safe calculations, or win laurels which are not dependent on the courage to take responsibility, is to banish the very elements of greatness." The fact that the Germans acted in accordance with this principle in the World War gave them a very great advantage and nearly won the war for them.

Sherman's march to Savannah is not now considered a very hazardous move, but at the time it was rightly considered dangerous and would not have been made but for the initiative of Sherman. The true facts are contained in a letter from the President, dated December 26, 1864: "When you were about to leave Atlanta for the Atlantic Coast, I was anxious, if not fearful; but feeling that you were the better judge, and remembering that 'nothing risked, nothing gained.' I did not interfere. Now, the undertaking being a success, the honor is all yours, for I believe that none of us went further than to acquiesce."

In making decisions regarding offensive operations it is necessary to be optimistic. Be willing to run risks and remember that Nelson said, "Something must be left to chance." Rely upon your ability to meet both unexpected and expected difficulties. These often clear away of their own accord.

Marshal Foch's inspiring optimism is illustrated by the following statement of Colonel Fagalde to Repington: Fagalde said, "Foch's accounts of a situation were usually rather prophetic than strictly accurate. In Marne days Foch had always told Joffre that all was well and would be better next day, even when he had lost some miles of ground. He always sent orders for his corps to attack the next day. All his commanders said that their men were done up, but they got orders to attack just the same. Finally the Eleventh Corps commander came personally and said that he was so depleted that he could not hold the line allotted to him, still less attack. But next morning, he, also, got his orders to attack, and fortunately the Boche ran away at last. It was Foch's idea that his will was superior to that of anyone opposing him, and that if he kept on long enough the enemy would go away."

The spirit of the offensive must be applied with ever-increasing force right up to the end of the war. Had the Carthaginian Senate applied this principle after Hannibal's first victories, Rome would probably have been defeated, but as Hannibal had been victorious the Senators stated that he required no further assistance, and sent all the reinforcements to Spain, where the Carthaginians had been suffering continual defeats.

In 1863, Sherman said: "We must fight it out. The moment we relax, down go all our conquests thus far." Grant's ideas coincided exactly with these and he deserves the greatest credit for the way in which he continued the pressure upon the enemy. A few days before the surrender of Lee, Sheridan reported that he believed the Confederate Army could be cut off and taken if the thing were pressed. Grant sent on this message to Lincoln; the President replied: "Let the thing be pressed."

XIX. THE LIMITED OFFENSIVE IN STRATEGY

Strategic operations with a limited offensive will now be considered. Such operations should be considered as a temporary expedient, which is either forced upon us by conditions over which the commander has no control or is made desirable by special conditions which are unusually favorable for such a form of warfare.

The underlying idea of this form of warfare is continual activity for the purpose of so reducing the enemy's strength that we may pass to the absolute offensive or of breaking down the communications of the enemy and thus compelling him to retire from his position. Inactivity should never be permitted, as it reduces us to a passive defensive.

There are a number of ways in which a limited offensive may be applied to a naval campaign:

1. Diversions with small forces, so as to attract stronger forces away from the battle and scouting forces of the enemy.
2. Attacks on the enemy line of communications so as to render his fleet inoperative for lack of supplies.
3. Attacks by our light craft on the vessels of the enemy battle and scouting forces, so as to reduce his superiority.
4. Operations with our scouting and battle forces for the purpose of forcing action on such portions of the enemy scouting

and battle forces as would give us a fair chance of defeating them.

Diversions are always valuable and frequent use should be made of this very favorable form of warfare. Mine-laying is extremely valuable. The Germans laid about sixty mines off our Atlantic Coast, while we had fifty-nine mine sweepers continually in service on the coast to sweep them up. The Germans always recognized the fact that it was just as important for them to keep the Allies busy sweeping for mines as to actually sink Allied ships with them. Submarine raids are also very effective. The Germans kept enormous numbers of men in the Allied nations away from the battle front by forcing their use in making up for the ravages of the submarine campaign. Aircraft attacks are a splendid form of diversion. The effect of the bombing raids on London is shown by the following statement made to Repington by General Robertson: "An account of the War Cabinet after an air raid made us all nearly die of laughter. After every little raid on London, the whole War Cabinet, shaking in its shoes after the bombing, assembles with the Ministers, Lord French, General Shaw, and the Air Board people and makes the devil of a fuss for two hours trying to find a scape-goat. Then French says that he has not been given the aeroplanes promised, which is true. Then the War Office is abused, and they show that they have not got them. Then they are ordered back from France, and then comes a setback in the air in France, and the machines are back again, whereupon follows a new raid on London, and all the thing begins again. The Boche would burst with laughing if he knew what fools he was making of us, and all the time there are a hundred raids on our men in France for one here. Moral—always bomb the seat of government when you can."

The Germans attacked with submarines the lines of communication leading into Great Britain with such effect as to nearly win the war. In this case, the lines of communication supported not only the Grand Fleet but the entire nation, and thus the submarine warfare developed from a subsidiary operation into a major one. The submarines also attacked the British communications leading to Salonika, while the British submarines nearly disrupted the sea communications of the Turkish Dardanelles Army. The Germans also twice attacked the Norwegian con-

voys to England with light surface craft and made several destroyer raids into the British Channel. It is difficult to see why the Germans did not make these highly successful attacks much more frequently. As it was, the British were forced to use battleships to escort the Norwegian convoys, and to place a pre-dreadnaught squadron in the Thames, thus causing to some extent a dispersion of their forces.

During the early part of the war the Germans used their light forces to wear down the British superiority in heavy ships. Their campaign cannot be said to have been effective. The mining of the *Audacious* and the sinking of a few pre-dreadnaughts and cruisers by submarines were the only important results.

Operations of the High Sea Fleet against portions of the Grand Fleet might well have been very successful. The sixteenth of December, 1914, might have changed the course of the war. At one time the six battleships of the 2nd Battle Squadron were within fifty miles of the High Sea Fleet and a contact seemed probable. Had it occurred, there was a probability of the British superiority being reduced to an equality in one day. The Germans would have had the further moral advantage of having won a great victory. Well might Tirpitz exclaim: "Ingenohl held the fate of Germany in the palm of his hand."

Scheer also had a great opportunity when engaged with the battle cruiser fleet and the 5th Battle Squadron at the Battle of Jutland. Any British ships which might have had their speed reduced a few knots would have come under the fire of the entire High Sea Fleet.

Of course, it must be realized that the Germans also ran considerable risks in these cruises of the High Sea Fleet, but as they had the initiative these risks would have been greatly reduced had not the British agents been able to give advance notice of every sortie of the fleet. The efficiency of the British Intelligence Service took away the advantage of the initiative.

XX. THE STRATEGY OF AN OVERSEA CAMPAIGN

Before leaving the question of strategy and passing on to that of tactics, it will be well to show one special case in warfare, which must be considered separately. This is the case of war between two nations situated at a great distance from each other, so that one fleet or army must make an exceptionally long cruise

or march to reach enemy waters or a vital part of enemy territory.

The strategic offensive in this case has difficulties and disadvantages which are not usually present in this form of war. At the time of the Athenian expedition to Syracuse, Hermocrates with unerring intelligence stated these difficulties: "Rarely have great expeditions, whether Hellenic or Barbarian, when sent far from home, met with success. They are not more numerous than the inhabitants and their neighbors, who will all combine through fear; and if owing to scarcity of supplies in a foreign land they miscarry, although their ruin may be chiefly due to themselves, they confer glory on those whom they meant to overcome."

It is true that history shows many failures of distant expeditions, such as Xerxes' expedition to Greece which ended at Salamis and Platea; the Athenian expedition to Syracuse; Crassus' defeat by the Parthians; Varro's overthrow by the Germans; the Crusades; the British attack on Carthage; Napoleon's Egyptian and Russian campaigns; the British Afghanistan campaign; and Rodjestvenski's passage toward Vladivostok.

On the other hand, there are still many examples of successful campaigns at a great distance from home. Among these may be included Alexander's campaigns; several Roman attacks on Carthage; Lucullus' seizure of Armenia with only twelve thousand men; Cæsar's campaigns in Gaul; the great migrations of the Goths and Vandals in the fifth century; the cruises of the Northmen to England, Ireland, Normandy, and the Mediterranean; the British combined expeditions which captured Havana and Quebec in the Seven Years' War; and the campaigns of Clive in India. In the World War the defense of German East Africa by von Lettow-Vorbeck was similar to a distant campaign.

These illustrations show that the difficulties of distant campaigns, while great, are by no means insuperable. Where they were failures, they were largely caused by errors which would have lost any campaign; where they succeeded, their success was due, as it always is, to the good conduct of the commanders.

In an oversea naval campaign the fleet operating in its own waters and from its home bases has exceptional advantages over the fleet which moves over the ocean into enemy waters and improvises its bases. Calling the fleet operating in its own home

waters "White" and the other fleet "Black," the special conditions are as follows:

1. Black, having lines of transportation far longer than White, will be required to assign a far greater force to the duty of protecting these lines.

2. Black, during his advance to the sea area off the coast of White, will offer the latter exceptional opportunities of attacking with submarines, destroyers and aircraft.

3. Black usually will have no docking or repair facilities in the sea area in which the campaign is being carried on, so that his ships in need of repairs or docking must be sent to Black home ports for this work, thus greatly depleting his forces; on the other hand, White will have all the necessary facilities.

4. Black will probably lose all vessels seriously damaged, due to his not having docking facilities immediately available; on the other hand, White, having these facilities, will be able to save his damaged vessels. Imagine the condition of the *Derfflinger*, *Seydlitz*, *Marlborough*, and *Warspite* after the Battle of Jutland, if there had been no drydock within three thousand miles.

5. Black, having a very long line of transportation, must devote a large proportion of his national effort to the organization of the transportation service. White, having practically no lines of communication, can devote practically all his national effort to building up his fighting forces. In the World War we would have been able to devote very little effort to building up our battle force.

6. Black, having no shore facilities for aircraft, will be able to use them only with great difficulty; this applies especially to lighter-than-air-craft. On the other hand, White will be able to make the maximum use of his aircraft, operating them from shore bases, prepared in advance.

7. Black will have far less knowledge of the weather and geographic conditions than will White; such knowledge is necessary for carrying out operations, particularly in fog or unfavorable weather; it is particularly necessary for the efficient operation of all forms of aircraft.

8. Black will be unable to advance before he prepares a great transportation service after the declaration of war; this gives White a period in which he may make his preparations and takes from Black to a great degree the advantage of the initiative.

For these reasons a navy taking the offensive without limit in an oversea campaign should have a superiority of three to two in fighting strength over the enemy. In the same way, the nation fighting in its own waters should use the limited form of the offensive unless it is equal in fighting strength to the enemy. In this case, it should seek action before the enemy can retire to his own waters, thus compelling it in turn to cross the ocean to gain a decision.

XXI. THE OFFENSIVE AND LIMITED OFFENSIVE IN TACTICS

We will now examine the ways in which the spirit of the offensive may be applied to tactics. In land warfare a commander may often decide to fight a battle using the limited form of the offensive. All Wellington's battles were this kind at their commencement. At their conclusion, he often passed to the absolute offensive. The battle of July 15 on the Western Front was of the same order. The retirement of the French in the Champagne to their second line really took the initiative in this portion of the field from the Germans. The Soissons counter-attack was at the beginning only a limited offensive, but it was so successful that Foch soon passed to the absolute offensive along the whole battle line. The advance of the Germans across the Marne caused the local commander to revoke the order for this counter-attack, but Foch, getting wind of this, ordered it to be made as per plan.

In an army there are some arms which can be used only offensively; these are cavalry, tanks, and most forms of aircraft. Offensive arms must get to close quarters. Major Nicholson uses this fact as an argument for the adoption of the long straight sword for the cavalry. "The ideal weapon," he says, "is the cold steel, the long sharp sword whose gleam can cast terror into the enemy and whose weight and length provide an objective upon which the cavalryman can concentrate the whole of his energy and lust for slaughter as the infantryman does on his bayonet. It is the concrete expression of the desire for contact, the desire to close and smash with the enemy. This desire must find expression if our cavalry is to remain superior to its antagonists. To keep the cavalry spirit we must keep the sword. It is our concrete expression of the will for the offensive. And without the offensive spirit cavalry is as nothing."

In the same way our destroyers with their torpedoes and short range guns, our submarines with their torpedoes, and our aircraft with their torpedoes or bombs can only be used offensively; their weapons are only effective at short range and they must come to close quarters with their enemy.

The fact that the range of the torpedo has been increased so that it is well over 10,000 yards does not in the slightest alter the fact that it is effective at short ranges only. This firing range must depend, of course, upon the conditions at the time; it must always be the shortest permitted by the conditions, because it must be remembered that, even when an entire formation is selected as the target, the chances of hitting decrease very rapidly when the range increases.

In a day action destroyers can approach an enemy formation very much closer than is generally believed. At Jutland there are actual cases to prove this fact. The *Nestor* and *Nicator* attacked the van of the High Sea Fleet at extremely close range. "Very soon," writes an officer of the *Nicator*, "we were in the thick of a perfectly hair-raising bombardment from their secondary armament. We were engaging a light cruiser at the head of the line with all our guns, the range on the sights being 3,000 yards." The *Nestor* was hit and put out of action, but the *Nicator* escaped unhit. "It seemed perfectly extraordinary that, in spite of the tornado of shells that were falling all round us, we were never hit once except by a few splinters." Even in this case, the *Nestor* and the *Nomad*, which had been damaged previously by battle cruisers, were able to fire all their torpedoes before being sunk. "We were about 2,000 yards, as far as I can remember," writes an officer of the *Nomad*, "from the leading German battleship when we fired the last torpedo, and so were at practically point-blank range for their 11-inch and 12-inch guns." This shows that if destroyer officers are prepared to sacrifice their boats they can fire their torpedoes at very close range even in a day action. Later on in the day the *Onslow* and the division of destroyers led by the *Shark* went in very close to the German battle line, and while almost all of these boats were damaged, only one was sunk, and even this one had opportunity to fire all its torpedoes. Even the Third Light Cruiser Squadron closed in to within 7,000 yards of the German battle cruisers and held this position for some time,

only one hit being received, and that way up on the foremast of the *Falmouth*.

Later on the German destroyers closed to within about 7,000 yards of the whole British battle fleet without the support of the fire of their own battleships. Although nearly all their destroyers attacked at this time, only two were sunk. The British fairly covered them with turret and secondary gunfire and claimed to have sunk a very large number of boats, greatly overestimating the effect of their fire.

The German battleships were probably as well equipped and trained in night fighting as any ships will ever be. Nevertheless, the British had remarkable opportunities for torpedo fire at point-blank range. For example, the *Spitfire* had three opportunities for short range torpedo fire. "The last destroyer in the line," writes one of her officers, "reported three ships closing us from astern, and shortly afterwards we could distinguish them as what appeared to be three four-funnelled cruisers. Occasionally flames from their funnels could be seen, but their identity could not be established. As they kept closing us and the *Tipperary* did not challenge, we concluded that they must be British, but when they were in to, I should think, 500 to 700 yards' range and nearly abeam of us, *Tipperary* made the challenge." A short time afterward the *Spitfire* and the German battleship *Nassau* rammed each other port bow to port bow. Finally a large cruiser missed her stern by only a few feet.

The *Tipperary*, *Ardent*, and *Fortune* were sunk at point-blank range, but even in this case, both the first two ships were able to fire torpedoes, so that the leading signalman of the *Ardent* was able to say as the ship was sinking, "Well, the old *Ardent* done her bit all right, sir." A little later the *Petard*, followed by a number of boats in column, sighted an entire column of German battleships only 500 yards off.

Destroyers should therefore consider 8,000 yards as their maximum range in a day action; on many occasions they will be able to cut this firing range in half. At night 1,000 yards should be the maximum range and captains should endeavor to get to within 500 yards of the enemy before firing. Whenever a detected attack is made, the range should be closed until the enemy's fire is effective and at least one fourth of the attacking boats are put out of action. In some cases, where there is a good prospect of get-

ting the torpedoes across the enemy's line before he detects the attack, it may be justifiable to fire at slightly greater ranges, as this form of attack deprives the target of an opportunity to avoid the torpedoes by maneuvering.

The gunfire of destroyers is also effective only at short ranges, due to the small caliber of their guns, the lively motion of the boats, and the exceptionally great rate of change of range. Their target will also be very small, usually a destroyer; if a large ship is the target, small parts of it, such as searchlights and the bridge, will have to be selected, as the greater part of the ship will be protected by armor which a destroyer's guns cannot penetrate. These facts also make necessary a vigorous offensive for destroyers, even when gunfire is their primary weapon.

While submarines have torpedoes which will run a moderate range, it is generally recognized that their torpedo is a short range weapon and that it can be used most effectively when fired from 300 to 700 yards from the target, which should be a single ship and not an entire formation, except when the inferior speed of the submarine prevents it from gaining this position. The submarine in battle is a purely offensive weapon.

Aircraft also have short range weapons; to hit ships with bombs they must fly at a very low altitude; to hit with torpedoes they must come in to the firing range of a submarine. Bombing and torpedo planes are therefore solely weapons of offense.

The question of the offensive as regards the battle force as a whole will now be considered. This force is composed of all types of ships necessary to fight a fleet action: battleships, destroyers, fleet submarines, and aircraft carriers.

In land warfare the conditions are somewhat different from those which exist in war on the sea. In the first place, there is no way of refusing action if the enemy wishes to fight. But, by acting on the limited offensive, the protection of trench systems and field fortifications give such great advantages that this form of warfare is often resorted to. An excellent example is the use made of the lines of Torres Vedras by Wellington; in this case he was almost as secure against attack as a fleet in its own bases.

In naval warfare, it has thus far proved practicable for a fleet to refuse action by keeping within such a close distance of its bases that it cannot be cut off by a superior fleet or forced into

action by one pursuing with greater speed. However, this means a passive defensive; the limited offensive requires operations farther afield and there is a considerable chance that a fleet operating in this way will be brought to action. Thus Hipper with the German battle cruisers was overtaken by the superior and faster British battle cruisers at the Dogger Bank, and at Jutland the High Sea Fleet was cut off from its bases by very superior British forces. In such cases, it will usually be necessary to make use of the limited offensive in battle to disengage the battleships from the superior enemy force.

A fleet acting on the limited offensive lacks, of course, the advantage which the protection of the ground gives to an army on land, but a very similar factor has recently been introduced in the torpedo, the mine, and the smoke screen. These are all more useful in a fleet acting in accordance with the principles of the limited offensive than on the absolute offensive. In this kind of battle the light forces—destroyers, submarines, mine-layers and aircraft—must be used in a most vigorous offensive, as there is a good chance that the superiority of the enemy may be so reduced by these attacks that our entire battle force will be enabled to turn and take the offensive. Destroyers may always disengage a force of battleships by laying a smoke screen between them and the enemy, but they must always keep in the screen or must lie in ambush close behind it for a close range attack on enemy battleships which may push through the screen in pursuit.

The question now arises as to whether an inferior fleet should use the tactics of the limited offensive only when it is having action forced on it against its will or whether it would be advisable for an inferior fleet to deliberately offer battle with the idea of using the limited offensive to reduce the enemy's superiority and then passing to the offensive to complete the victory. This latter procedure opens out interesting possibilities. It requires for success great mobility and perfect co-ordination between battleships, battle cruisers, light cruisers, destroyers, submarines, and aircraft. The High Seas Fleet had both of these requisites to a very high degree. The maneuvering ability of the battleship squadrons and the perfect co-ordination of different types far surpassed anything yet attempted in naval tactics. Nevertheless, Scheer did not use the limited offensive, but brought his battle

squadrons twice into action at close range; there is every reason to believe that he would have brought on a continuous action had his tactical position and the visibility not been so very unfavorable. The German admiral reserved the use of the limited offensive to the disengagement of his battle squadrons from these two unfavorable positions. This course of action is believed to be correct; if action is deliberately sought, the fleet should fight on the offensive. It is believed that an inferior fleet has an excellent chance of partially defeating one far superior to it, if it has the advantages of mobility and co-ordination over the enemy fleet. It must be realized, however, that such a partial victory will seldom be decisive, due to the superior strength of the enemy, but several of these actions in succession may well so reduce the enemy's superiority that a battle with equal forces may be fought.

XXII. *Summary*

The conclusions arrived at in this paper will now be briefly summarized.

1. Our personnel, and particularly the officer personnel, must have the spirit of the offensive.

2. In the development of this spirit our military and naval tradition should be made use of persistently, and every opportunity should be taken for building up new tradition.

3. Our War Instructions and our courses of instruction in strategy and tactics should emphasize the value of the spirit of the offensive, and should prescribe its application in warfare.

4. Officers should be encouraged to read military and naval history, as this is certain to demonstrate the advantages of the spirit of the offensive and to create a military and naval atmosphere in their minds, thus accustoming them to the conditions of warfare and inspiring in them a real fighting spirit.

5. The influence of the commander upon his forces is very great; therefore officers should be so trained in peace that a spirit of boldness and eagerness to take chances will be encouraged; only officers of proved boldness and resolution should be appointed to flag commands afloat.

6. The most potent method of maintaining the spirit of the offensive in war is to win victories in the field and gain a marked ascendancy over the enemy.

7. The bad effect of exhaustion must be recognized, and it

should not be considered a disgrace for a commander, who has previously done excellent work, to be relieved for this reason.

8. As we win successes, our efforts should not be relaxed, but should be increased. The enemy must be pressed to the very end.

9. An offensive spirit is of no value unless we have an organization in which it can be successfully used.

10. Flag officers should be given every opportunity to develop their power of decision. Strong staff officers are essential for preventing changes of plan once the decision has been made.

11. The development of War Instructions for all classes of vessels should be given first priority and these instructions should be tested rigidly in maneuvers; all officers should be trained in their application.

12. Courses of instruction for war staff officers should be commenced, and graduates of this course should be assigned to all staffs. Administrative details should not be allowed to interfere with their more important work of war preparation.

13. Whenever naval forces leave for a cruise all measures which would be taken in war should be carried out; no cruise should be taken without the execution of some tactical or strategic problems enroute.

14. All offensive operations have two advantages: surprise and increase of morale.

15. A force acting on the offensive has an advantage of about twenty per cent over one operating on the limited offensive and forty per cent over one assuming a passive defensive.

16. In a campaign in which both nations are within easy striking distance of each other, only a decided inferiority in fighting strength or strategic position justifies the limited offensive.

17. A passive defensive is never justified.

18. In an offensive campaign careful planning is an essential. In the estimate of the situation do not exaggerate the strength, ability, and strategic position of the enemy. This will paralyze offensive action.

19. In an offensive campaign a commander should not hesitate to risk everything in a fleet action, into which all his forces should be thrown. If he has a decided ascendancy over the enemy, the rapidity and impetuosity of Suvorof's attack should be his

guide. If the enemy is of nearly equal ability, Nelson's careful planning and vigorous execution should be his model.

20. If it is necessary to use the limited offensive, constant activity is the first essential. This form of operations should be regarded as no more than a temporary expedient and a commander should be prepared to pass to the offensive as soon as the conditions will permit.

21. In limited offensive operations the battle and scouting forces should be constantly used, as well as the light forces, and whenever we have fair chances of success in a fleet action with the whole or a portion of the enemy fleet, such an action should be forced.

22. An oversea campaign should be considered as distinct from the usual form of close campaign. For us, however, a naval campaign will probably take this form, and it is therefore important for us to consider it carefully.

23. In such a campaign a force operating in its own waters and from bases prepared during peace has such unusual advantages that a limited offensive may be desirable, where in a close campaign it would not be justified.

24. In an oversea campaign the force acting on the offensive and proceeding into enemy waters should have a superiority of about three to two to have an even chance of winning the campaign.

25. It is not considered advisable to offer battle deliberately with the idea of fighting on the limited offensive, as this requires almost perfect co-ordination and unusual mobility to have a reasonable prospect of success.

26. In case, however, one force has action forced on it against its will, then it should act on the limited offensive; this should always permit a retirement without severe losses. In fact, there is a possibility that considerable losses may be inflicted on the enemy by destroyers, submarines, mine-layers, and aircraft, and the retiring force should be prepared to turn and assume the offensive.

27. In all other cases each fleet should take the offensive in a fleet action. It is considered that superiority in co-ordination and mobility gives an inferior fleet excellent chances of winning a partial victory over a more powerful, but unwieldy, enemy. If

the superiority of the enemy in numbers is very great, it will probably be necessary to win several such partial victories, before a decision can be gained.

28. Destroyers, submarines, and aircraft are offensive arms only and should always be so used, even if the battle force as a whole is operating on the limited offensive.

29. Actual battle experience has conclusively demonstrated the fact that destroyers can and must use very short firing ranges. The maximum range for high visibility attacks in daylight should be 8,000 yards and the firing range should not exceed 1,000 yards during darkness or low visibility. It will usually be possible to reduce these ranges by one half, without more than one fourth of the attacking units being put out of action. This latter condition should be fulfilled in destroyer attacks, unless there is a chance to get the torpedoes across the enemy formation before the attack is discovered, when torpedoes should be fired, before there is a probability of the attack being detected.

30. Submarines should use firing ranges from 300 to 700 yards, unless they are prevented from gaining these positions by their inferior speed.

31. In case it is difficult to decide upon the form of operations to be carried on, the benefit of the doubt should always be given to the offensive.

32. Every mistake in war is excusable except inactivity and refusal to run risks.

(The End)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

OUR PRESENT NAVAL SITUATION

BY COMMANDER R. A. KOCH, U. S. NAVY

November 11 is the fourth anniversary of the Armistice and the first anniversary of the meeting of the Limitation of Arms Conference.

During the past year there have been many articles on this conference, and many arguments on what our naval policy should be. Without attempting a complete review of the subject, it is possible to briefly state the accomplishments of the conference; the need of the Navy; its cost; and what should be our constructive policy.

ACCOMPLISHMENTS OF THE CONFERENCE

We recommended definite limits on all classes of fighting craft, based on the ratio of the actual existing battleship strength of the five principal naval powers.

The following is quoted from an address delivered by Rear Admiral H. S. Knapp, U. S. Navy, on April 27, 1922, before the American Society of International Law, and published in its *Proceedings* for that year:

"A convenient method of examination will be a comparison of the proposal put forward by the Secretary of State on November 12, 1921, with the actual accomplishments of the treaty. Reduced to its lowest terms, the proposal consists of the following main points definitely stated:

"(1) Limitation of the total tonnage of capital ships (battleships and battle cruisers) for each of the signatories. This was established.

"(2) Limitation of the size of future capital ship units. This was established.

"(3) Limitation for each of the signatories of the total tonnage of auxiliary combatant ships classified as follows:

"(a) surface vessels, and

"(b) submarines, neither of which class was limited and

"(c) Airplane carriers, which class was limited.

"(4) Limitation of the size of guns to be carried on board auxiliary combatant ships. This was established.

"(5) Restrictions upon disposal and building of all classes of combatant ships, as follows:

"(a) no disposal for use in another navy, which was accomplished.

"(b) no acquisition from foreign sources, which was partially accomplished, but not entirely.

"(c) no building for foreign account, which failed of accomplishment.

"The ratio of the floating naval strengths to result eventually between the signatories from the acceptance of the American proposal did not appear therein as a definitely stated feature, none the less, the ratio is there, a very important feature, deducible from the tabulations of the proposed allowed strengths in each of the several combatant classes, for each of the signatories of the three principal naval powers. It was accomplished in part, for capital ships and aircraft carriers only.

"Another feature of the proposal that was not definitely stated was the abolition of competition, but the idea lay behind the whole program. It was not so much armaments themselves that had brought the world to the point of exasperation as it was the swollen armaments resulting from competition. Some armament is recognized as a necessity by all but a few extremists; and in this connection it will be recalled that the President of the United States, before the Conference met, took occasion to warn the nation that the Conference was not one for disarmament but for the limitation of armaments. The treaty abolishes competition in two classes only, battleships and aircraft carriers. These are the most expensive ships to build because of the great tonnage of units; but they are not the most expensive per ton. In the cruiser, flotilla leader, destroyer and submarine classes, the nations are free to continue competition, untrammelled by the treaty

except for the restrictions placed upon the size of individual units (10,000 tons) and the caliber of guns (eight inches). In passing, it may be noted that competition in the past has not been confined to total tonnage or numbers; it has existed in the design of ships and guns, each nation endeavoring to obtain greater offensive and defensive powers in new designs. Unrestricted competition in design has resulted in constant increases in size of both ships and guns. There is no reasonable objection to competition in design within fixed limitations, such as are provided in part by the treaty, but not entirely; for example competition in design can still go on in the size of destroyers or submarines up to the 10,000-ton limitation, and in their armament up to eight inches, as well as in their numbers.

"Two other limitations, not mentioned in the proposal, were established by the treaty, both of value because looking toward the general aim of the Conference, and neither objectionable because affecting equally all the signatories. These are the limitation of the size of auxiliary combatant ships (27,000 tons for aircraft carriers and 10,000 tons for all others, which latter is practically a cruiser limitation), and the limitation of the caliber of guns to be carried on board capital ships (sixteen inches). It should be added that regulations for the conversion of merchant vessels, provision for which was declared by the proposal to be a necessity, were established to the small degree of forbidding preparations in time of peace other than stiffening decks for guns not to exceed six inches in caliber.

"It is interesting to note the relative tonnage proposed to be scrapped by the American program. In the following comparisons the American tonnage scrapped will be used as the basis, reckoned as 100 per cent, and the order of mention will be United States, Great Britain and Japan in each instance. Considering total capital ship tonnage scrapped, the percentages are respectively 100, 69 and 53. This is the comparison usually stressed in non-technical comment, but it is very misleading because it includes for all three nations a number of superannuated ships due already or about to become due, for scrapping, Conference or no Conference. The fairest comparison is based upon new tonnage laid down plus that about to be laid down and for which expense had been incurred in the preparation of material; on this basis the respec-

tive percentages are 100, 28 and 46. The offered sacrifice of the United States was not only the greatest absolutely; it was greatly out of proportion to the relative ratio of strength proposed to be retained. There is no gainsaying the generosity of the American offer. No further concession was needed to make manifest the sincere attitude of the United States; nor should the United States have been expected or asked to make further concessions—certainly not unless the result would affect all equally and not involve an additional relative sacrifice by the United States.

"The concessions offered went further than accorded with the general sentiment of experienced officers of our Navy. Occasion is taken to say here that the general sentiment of American naval officers was not in opposition to limitation, but quite the reverse. That officers were not prepared to go as far as others might was, however, both natural and proper. The Navy is the country's first line of defense, and its personnel deeply feels the responsibility entailed. Its motto for the country is "Safety First"; its duty is far-sighted preparedness—such preparedness as the action of other agencies of the Government may make possible. In advice or action, naval officers have a life-long responsibility for the security of the nation, in which respect they, in common with their brothers of the Army, are in quite a different position from that of any other persons in the Government. Questions of immediate expediency do not have much weight with them, and they are not perhaps so inclined to take chances with national security as those having a shorter tenure of office. Upon them is bound to fall the brunt of an underestimation of the necessity for defensive measures. That they are conservative is the natural consequence. Their conservatism did not, however, go so far as to lead them into opposition to the principle of limitation of armaments.

"The opening sentence of Art. XIX of the treaty reads: 'The United States, the British Empire and Japan agree that the status quo at the time of the signing of the present Treaty, with regard to fortifications and naval bases, shall be maintained in their respective territories and possessions specified hereunder.'

"When the specifications are read all the territories and possessions to which they refer are seen to be insular. The agreement includes everything insular that Japan holds now or may acquire

outside of the Islands of Japan proper; it includes our Aleutian Islands and everything insular, present or future, under our flag west of the Hawaiian Islands; and it includes Hong Kong and present or future insular holdings of the British Empire east of 110 degrees east longitude, excepting the Canadian Islands, Australia and its territories, and New Zealand. It will be noted that the language of the article is 'fortifications *and* naval bases,' not 'fortifications *of* naval bases,' which latter would have been much less sweeping. Status quo is defined in the last paragraph as follows: 'The maintenance of the status quo under the foregoing provisions implies that no new fortifications or naval bases shall be established in the territories and possessions specified, that no measures shall be taken to increase the existing naval facilities for the repair and maintenance of naval forces, and that no increase shall be made in the coast defenses of the territories and possessions above specified.'

"An examination will now be made of the equities of this remarkable graft upon the proposal of the Government that called the Conference. The proposal made no mention of naval bases, or naval facilities of bases, or fortifications or coast defenses, and it must be presumed that the omission was deliberately intended after months of preparation for the Conference.

"Mahan gives position, strength and resources as subjects for examination in determining the availability of a situation for a naval base. Actual strength and existing naval facilities will first be considered, in doing which it must be remembered that the details of foreign fortifications are rarely known accurately; their general scope is, however, usually known or believed to be known.

"The United States has in Guam a location for a naval base that is wonderfully situated strategically. To state that its fortifications and equipment are derisible now is to disclose no secret. This is no fault of the Navy, which for years has sought in vain for the appropriations to make Guam a secure base. In the Philippines there is another great site for a naval base in the Manila region. The entrance to Manila Bay is fortified, but the fortifications need modernizing and the naval facilities are far from being what would be necessary to support the operations

of a fleet in war. To meet a menace to the territories under our flag in the Western Pacific, we need a secure naval base in the Philippines and another intermediate between them and the Hawaiian Islands. While neither Guam nor Manila is in efficient condition to support a fleet in war, up to February 6 last, the United States possessed the sovereign right to make them so.

"The British have at Hong Kong a naval base now strongly fortified and well provided with supplies and equipment, including drydocks, either on the island or in the leased territory of Kowloon on the mainland just across a narrow channel. Hong Kong is ceded territory; Kowloon is leased only. Yet the two are really a whole for British purposes, and Kowloon does not fall under the inhibition of Art. XIX, for it is not insular. In the convention of June 9, 1898, between Great Britain and China for the extension for ninety-nine years of what was therein designated as the 'Hong Kong territory' although the extension was entirely on the Kowloon—mainland side, the right to erect fortifications is recognized. As far as Art. XIX under consideration goes, the right is not denied to the British to fortify and increase naval facilities on the Kowloon side at Hong Kong. It is evident that the British exercised no self-denial in subscribing to Art. XIX."

We made by far the greatest sacrifice. We scrapped our potential naval power consisting of thirteen capital ships well along in their construction on which we had already spent one-third of a billion dollars, and which when completed, would have given us undisputed naval supremacy. We relinquished our right to fortify our possessions in the Western Pacific, thereby reducing our potential naval power in the Far East to an almost negligible amount.

As agreement of limitations was reached only on two classes of ships—capital ships and airplane carriers—competitive building has not ceased.

THE NEED OF A NAVY

A navy is essential if we are to exert our influence effectively for the general good; support and secure our national policies; protect our own interests and maintain our security as a nation. The Navy protects our commerce; protects the interests of our

citizens, and is thus essential to our general welfare and future prosperity affecting every citizen. Our foreign policy is as strong as our Navy and no stronger.

The part the Navy has played in all great wars has been largely overlooked. It can be given as an almost invariable rule that ultimate success in war lies with the power that controls the sea, having the resources of the world at its disposal and strangling its opponents by blockades.

It must not be forgotten, however, that the Navy is only the first element of seapower which consists of: (1) Navy; (2) Naval and Commercial Bases; (3) Merchant Marine. To these might well be added radio and cable communications.

Sea power is the firm support of peace-loving statesmen. Wisely controlled, it constantly exerts a silent pressure on those who would by the exercise of ruthless ambition, override the right of their neighbors to go about the legitimate business of life in a peaceful, orderly manner; it insures justice and fair treatment to those of our citizens who undertake trading ventures abroad; it enables this country peacefully to perform its legitimate business with the rest of the world without recourse to force of arms to preserve its just rights.

COST OF THE NAVY

The per capita cost of the Navy is about \$3.00. In the Agricultural Districts where the Navy is most opposed, the cost per capita is about twenty-five cents.

The exports of agricultural products amount to about three billions annually and are approximately half of our total exports. Our first Navy was built to protect our export of wheat through the Mediterranean when we decided to quit the policy of bribing the Barbary States to obtain our rights. An Agricultural District is properly represented when its vote is cast for a fully adequate Navy. There is much misinformation about the burden of the Navy—generally the cost of past wars are included which cost is principally “the cost of unpreparedness.” The Federal taxes although not as evenly distributed as local taxes amount in total to about one-third of the total taxes, and the Navy is only allotted eight per cent of this third or about two and one-half per

cent as an average, and only about one-half of one per cent in States of the Middle West where the Navy is most opposed.

There is adverse comment on the small expenditures made by the Federal Government for education; this is not a function of the Federal Government, but one of the chief functions of the Federal Government is to "provide for the common defense." In local taxes, over one billion dollars are collected for schools; this may be insufficient, but education is no more a federal function than is the police force or fire department.

The Navy as an asset to industry alone, has probably paid for itself. The following is quoted from a lecture delivered by Rear Admiral J. K. Robison, U. S. Navy, and Chief of the Bureau of Engineering, Navy Department, before the Michigan Bankers' Association at Detroit, Mich., June 10, 1922.

"I believe I can state without exaggeration that the Navy has done more for commerce, science and labor than any other existing department of the Government. This appears to be an astounding statement in regard to a service whose duty is popularly believed to be confined to fighting battles. Let us examine the facts. The people of our country have first and last spent a lot of money on the Navy, and they have loyally supported it with the knowledge that the money spent was for necessary national insurance. If they knew the money spent was something more than a fire insurance premium, that it was the means of building up the national wealth through the stimulation of industry, our ultra-pacifist friends would have less luck in appealing to the prejudices that many of us have against paying taxes in time of peace to support an efficient Navy.

"The great stimulation of industry in the United States began in the early eighties and dates from the birth of the 'New Navy,' the original 'White Squadron' which rose out of the ashes of the old Civil War Navy, which, neglected through national lack of interest in events outside our own borders, had all but disappeared.

"The Act of August 5, 1882, provided for two cruising steam vessels to be constructed of *steel of domestic manufacture*. This requirement aroused the fierce opposition of the shipbuilders because the steel industry of the United States could not furnish enough mild steel for the construction of two vessels of less than

5,000 tons. Industry in the United States used either wrought iron or imported steel from England. In addition the steel we made was inferior and did not come up to the specifications prescribed by the Navy Department. The American Iron companies refused to erect the costly mills to handle the new material required unless they were guaranteed a volume of business that would justify the original investment. These mills were not built until the contracts for the New Navy were let. The Navy Department stood pat on the specifications and insisted on the best grade of steel that could be produced. The mills were forced to experiment until they could make this steel. When they learned how they found it was just as cheap to make good steel as poor steel. Steel suitable for ship plates dropped from eight and one-half to four and one-half cents a pound. This was lower than wrought iron and brought steel within the reach of every industry. Domestic consumption of steel increased a hundredfold as steel was applied in many trades that hitherto had used other materials. The United States Steel industry is now the greatest business in the world. The late Andrew Carnegie said this industry was built up on the United States Navy, whose contracts, specifications and inspection work made steel what it is today.

"The growing Navy demanded in addition all manner of cast, forged and machined steel. This demand called for better and larger machine tools and this industry began to grow apace. The insistence upon a domestic production and the success of the country's machine designers and operators caused a revolution in methods. America became independent of Europe for machinery and new items were added to our export trade. Machines large and accurate enough to handle turret mounts and big guns were equal to any task of private enterprise.

"The Navy Department starting as the parent of industry became its pacemaker. Each new set of specifications set the requirements a peg higher. In battle nothing but the best is good enough. The manufacturer charged the Navy more for the best until he learned how and then quantity production brought the price down to the old level of the inferior product. Private industry could not do this.

"The reason the Navy gives greater stimulation to industry than does private business is that the Navy exists to defend the nation, while private business exists for profit. Private concerns must consider the cost of materials. The Navy is concerned with the quality of materials. Victory cannot be measured by money. If a gun can be built of material that will give greater range, greater endurance and greater accuracy we must have it even if it costs ten times as much as another gun that is not as good. It has been truly said that in battle a second best Navy is like a second best poker hand. Then again on board ship weights must be kept down in order to get the most out of the tonnage. On shore cheap, heavy cast-iron can be used where on board ship you will find forged steel. In addition since metals corrode more quickly at sea than on land there is need for special bronzes and alloys. The Navy has built up the industry in these classes and recently by large orders has put the important Monel Metal industry on its feet. The Navy Department organized and paid for the research that discovered the harmful effect of sulphur on steel and improved the manner of working it to bring out its maximum strength. These discoveries were turned over to industry with the result that the whole nation profited with its safe and reliable automobiles, street cars, elevators and so on. The armor plate industry has carried on more research into methods of treating and alloying steel than any other industry.

"The demands of the Navy for high speed ships combined with low weights necessitated the design of whole plants for our new vessels. The Bureau of Engineering was forced to design these plants, to invent parts that had never been developed, and to conduct a laboratory for constant research and improvement. The urgent demand for increase of speed, reliability, and safety, with vital necessity of economy in fuel consumption has made the Navy the pioneer in all new developments. The merchant service has followed step by step the increase in steam pressures, multiple expansion engines, turbines, internal combustion engines electrical and geared reduction to propeller speeds, which were all developed by the Navy.

"In the electrical field the Navy was again the pioneer. Starting with the incandescent lamp every new electrical discovery

has been fathered and adopted by the Navy before its commercial use has been found practicable or profitable. The Navy Department enabled the General Electric Company to produce the first electrically propelled ship in the *Jupiter*, now the aeroplane carrier *Langley*. This development is one of the greatest in the art of ship propulsion and has been adopted for all future battleships. The radiophone which is now the talk of the country is simply the coming into commercial use of a development that has been in general use in the Navy for the last five years and was installed experimentally in 1907.

"The great radio telegraph plants that now encircle the globe are owned and operated by the Navy. Without the Navy's interest, experiments, and research, as well as the substantial contracts to manufacture, the radio industry in this country would be wholly in foreign hands.

"The radio compasses that flank all our great ports are owned and operated by the Navy. By their use any vessel by simply requesting her position by radio can be told to a degree what her direction is from each station within call and thus fix her position whether in fog or storm. This makes navigation secure and saves many a big liner from disaster as well as delay in making port.

"In our anxiety to have the best produced in every field of industry every promising device is built and tried out to determine its merit. If rejected, manufacturers are saved the loss of attempting commercial production. If a success they benefit by it. Rigid specifications that require the highest possible results lead to constant improvement and development in manufacturing materials and methods. The results are at once reflected in improved commercial products. A simple case in point was that of a large pump manufacturer whose product was good, but capable of much improvement. The Navy on a large order for pumps required a tensile strength for the naval brass of which they were made of 30,000 lbs. The manufacturers claimed that this was impossible and in their contention they were supported by the rest of the trade. The Bureau of Engineering insisted and pointed out that by experimenting with different heats the solution of the problem would be found to be one of temperature. This proved to be the fact and tensile strengths of 50,000 lbs. were

easily achieved. This resulted at once in a lighter, cheaper and more reliable pump.

"In the same way the money we spend for aviation is devoted to study, experiment and research to develop the utmost with the means available. Each new stride in aviation brings the art nearer the goal of profitable commercial use.

"So far I have alluded only to the material side of industry, but there is another side that is more important, that is the personnel side. Due to the fact that the great bulk of the enlisted personnel enter the Navy at an age that precludes knowledge of trade, it is necessary that they be taught one. For this purpose the Navy has become one of the greatest trade schools in the world. On board ship there is scarcely a trade of any importance that is not represented. A battleship is a miniature city, with all the activities of an industrial city represented. Ships nowadays must be practically self-sustaining so that everything that goes into its manufacture must be capable of restoration or repair. As the periods of enlistment are short this great body of young mechanics is turned out into the industrial world in a steady flow, 67,000 last year. What the Navy loses industry gains. All may not qualify but all have improved in knowledge, physical strength, discipline and self-reliance. A crew of 1,200 boys that can keep a battleship going can keep any other plant going.

"Graduates of the Naval Academy equipped with special technical knowledge have passed into civil life and made national names for themselves. Among these may be mentioned Homer L. Ferguson, President of the Newport News Shipbuilding Company, and former President of the National Chamber of Commerce; Joseph Powell, recently head of the Bethlehem Shipbuilding Plants; W. L. R. Emmet, Consulting Engineer, General Electric Company and designer of electrical ship propulsion; Professor Michelson of Chicago University, probably the greatest living scientist; Sprague, Fiske, and dozens of others who have gotten their training in the Navy. The Navy turns out men skilled in all the present day trades except farming, mining and masonry. The custom of shop mechanics having to operate a single machine has tended to seriously reduce the number of all-round mechanics. The mechanic on board ship being chiefly engaged on repair work gets a wide variety of experience and has

less trouble in finding a job during periods of industrial depression than those with limited training in private plants.

"There is another phase of Naval activity to which I would invite your attention. One of the chief missions of the Navy is to protect trade. In all regions of the world where trade would go and where political conditions are unsettled you will find our Navy on the job seeing that our commerce and our business men get the protection they require.

"In the far reaches of the Yangste Kiang, 1,700 miles up the river, you will find our gunboats guarding our interests, settling troubles and protecting against pirates. This costs the Navy \$3,000,000 a year, but our trade with China is over \$145,000,000. Our destroyers are operating in Turkish waters and the Black Sea, protecting our tobacco trade of \$15,000,000 and our oil trade with Batoum. An American Admiral sits as High Commissioner at Constantinople and combines diplomatic with naval authority to see that our trade is unmolested. Due to his efforts our trade with the Near East has increased 1,000 per cent in the last two years.

"Our naval forces in the Carribean protect our great fruit trade of \$50,000,000 annually coming from that region. Revolutions are constantly occurring and without the protection of our ships our fruit steamers would be held up, cargoes ruined by delays and trade outlets destroyed. As it is now fruit cargoes move with certainty and adherence to schedules of passenger trains in the United States."

WHAT OUR CONSTRUCTIVE POLICY SHOULD BE

Our naval policy is defined by the spirit of the treaty. It is, and can be nothing else than that the United States shall maintain a naval strength on a parity with that of Great Britain and five-thirds times that of Japan. This policy having been provided by the treaty-making power of our Government, it follows that if we maintain the policy thus formally declared we must not only build sufficiently in all classes not limited by the treaty, but provide adequate personnel so that our ratio as thus prescribed may be preserved.

Unfortunately it has been generally overlooked by the public that the strength of our fleet depends almost entirely on the effi-

ciency of its operation. If the 5-5-3 ratio is to have any significance we must maintain the ratio in personnel as well as in material.

The following tables show the relative strengths in cruisers and submarines, of Great Britain, Japan and the United States:

LIGHT CRUISERS LESS THAN TEN YEARS OLD

<i>Country</i>	<i>Built</i>		<i>Building</i>		<i>Total</i>	
	No.	Tonnage	No.	Tonnage	No.	Tonnage
Great Britain...	44	218,390	5	34,600	49	252,990
Japan.....	10	51,210	15	106,520	29	157,730
United States...	0	—	10	75,000	10	75,000

The United States should have a light cruiser tonnage five-thirds times that of Japan. In order to maintain this ratio, 262,883 tons of light cruisers are required. We are short of this ratio 187,883 tons, about nineteen ten-thousand ton light cruisers.

SUBMARINES

<i>Country</i>	<i>Built</i>		<i>Building</i>		<i>Total</i>	
	Under 1,000 tons	Over 1,000 tons	Under 1,000 tons	Over 1,000 tons	Under 1,000 tons	Over 1,000 tons
Great Britain...	43	9	6	2	49	11
Japan.....	28	00	21	25	49	25
United States...	59	3	35	3	94	6

The United States has urgent need for submarines with long radius, that can operate across either ocean without bases. Our small submarines are useless for that purpose. A large percentage of our submarines are out of commission, due to lack of personnel.

The United States is ahead of her ratio in destroyers, but destroyers cannot take the place of light cruisers or submarines and at the present time about two-thirds of our destroyers are out of commission, due to lack of personnel.

It is difficult to make a direct comparison of personnel with Great Britain for in their estimate they appropriate under fifteen different "votes." In "vote" one, appropriation is made for 88,805 men for the fleet, which does not include a large number of Reservists used constantly on fleet auxiliaries; the Navy's quota of the Air Service; men on shore; men in service under Dominion and Foreign Governments; men in the Colonial Navy. We do not man our Navy in part with Reserves. We include our air force, recruits in training on shore, men at trade schools, recruiting stations and other necessary military activities. On a conservative basis, to place our naval personnel on a substantial parity with that of the British Navy, we should appropriate for about 120,000 men.

Japan has a total enlisted personnel of 65,469 men; if we maintain our 5-3 ratio we require five-thirds times 65,469 or about 109,115 men. We have a total of 86,000 men.

We must modernize our battleships as allowed by the naval treaty,—this has been done by Great Britain. It has been our policy not to spend large sums on modernization but to apply this amount to new construction. Our building program, to be scrapped under the treaty, contained all the latest features.

In time of war all navies are greatly expanded; we must make it an important part of our policy to organize and maintain a sufficient and efficient naval reserve.

SUMMARY

1. The United States made by far the greatest sacrifice in order to establish the principle of Limitation of Armaments by international agreement.

The Conference succeeded only in limiting capital ships and airplane carriers.

Naval strength, although the battleship is the backbone of the fleet, depends also on auxiliary arms of the naval service, such as cruisers, submarines, destroyers and aircraft and most of all on the efficiency of operation, the efficiency and sufficiency of personnel.

We agreed not to establish naval bases in the Western Pacific, thereby reducing our potential power in that locality to a negligible amount.

Competition has not ceased in the increase of material, its design or in the sufficiency or efficiency of personnel.

2. An adequate Navy is necessary in order that we may exert our influence effectively for the general good; secure and maintain our national policies; protect our own interests; insure our future prosperity; and maintain our security as a nation.

3. The cost of the Navy is approximately two and one-half per cent of the total per capita tax; is very much less than this for those paying little or no income tax, and greater with the increase of income tax and with above average purchases of articles on which luxury and internal revenue taxes are levied.

The cost of the Navy should not be confounded with the cost of past wars, it is an insurance against future wars and the excessive cost and duration of war if come it must.

The cost of the Navy during peace is in great part repaid by its aid to industry and commerce.

4. Our policy under the treaty can be nothing other than maintaining a Navy at least on a parity with Great Britain and at least five-thirds that of Japan, in regular personnel, naval reserves and fighting craft.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

NAVAL MINES

BY LIEUTENANT A. W. ASHBROOK, U. S. NAVY

The history of the development of mines and the influence they have had on the outcome of practically all great wars since our Revolutionary War is a subject little spoken of in our Navy. Very few of our officers have any definite knowledge concerning the various types we have, the strategic or tactical uses to which they could be put, or to our general mining policy. This lack of knowledge is due to two reasons:

First: Prior to the World War the development of the mine as a weapon was not undertaken to any extent by the great powers; particularly the United States and Great Britain.

Second: When the development of mines was forced upon us by the conditions of the World War, the work was kept not merely confidential but *strictly secret*.

EARLY HISTORY

The mine is not by any means a modern invention, for in the year of 1585, two vessels carrying explosives, fired by clock work, were used to destroy a bridge over the Scheldt River, during the siege of Antwerp. While this was in some sense a mine, it was not until years later that the first idea of the real submarine mine was conceived.

In the year 1775, David Bushnell, of submarine fame, carried out several successful experiments to prove that a charge of gunpowder could be exploded under water, and the birth of the submarine mine can be rightfully reckoned as at this time. Several types of mines were used by this inventor during the Revolutionary War against the British ships off New London and Philadelphia, and while the results were not entirely satisfactory, he succeeded in awakening the interest of Robert Fulton, who took

up mine and submarine work where Bushnell left off. The name of Bushnell has always been associated with the invention of the submarine, but it is little known that this invention was necessitated by his looking for a means of placing a mine in position beneath an enemy's ship.

From 1797 to 1810, Fulton devoted practically his whole time to submarine explosive work and endeavored, in vain however, to have his own government as well as that of France and Great Britain, adopt his inventions for use. Failing to interest the foreign nations in this, he returned home and succeeded in having a commission of high government officials appointed to again consider the adoption of the mine as a part of our National defense system. The way in which Fulton felt concerning mines as weapons of defense is shown by his closing speech before this commission which was:

Gentlemen:

You who feel sensible of the tyranny European navies exercise over us, and the embarrassment under which our government and these states now labor in consequence of such tyranny; You who meditate on the facts of this invention can look forward to the liberty of the seas, when our ships will require no protection against the elements, and find no limits but those of the ocean. I hope you will use your influence to procure the necessary funds for such experiments. On my part I volunteer my services to conducting it; with confidence I promise you the most satisfactory success.

But what, however, may be your decision, whether you now support this system and carry it into effect, or abandon it to the chances of time, I, will never forsake it but with my breath, and I shall hope to see it become the favorite means of protecting the commerce and liberty of my suffering country. Should I sink under the casualties of life, it will be an orphan of the arts which I recommend to the guardianship of my fellow citizens. Let them nourish it with the care which I have watched over it for nine years past, and I predict that their recompense will not only be immense in the economy of blood and treasure, but as lasting as this continent which it will make our own.

From Fulton's last experiment in 1810 to 1842, nothing was done with mines. In 1842, however, Colonel Samuel Colt demonstrated that a mine could be fired by electricity from a distant station, and from this dates the birth of the Controlled Mine.

During the Crimean War, mines were planted by the Russians, but while they exploded in two instances little or no damage was done to the enemy vessels.

The advantages of mines were early recognized by the Confederates during our Civil War, and were used on numerous occasions by them. Their use was not the outcome of any extensive study of the science of mining but was due to their being forced to adopt something to counteract the Union blockade. It was purely a case of "Necessity being the mother of invention." Upon recovery of many of the mines used during this war it was discovered that they were fitted with the same crude types of firing devices as used by Bushnell. Thus it will be seen that after a period of almost one hundred years we did nothing towards the improvement of mines.

The effectiveness of the mines used during the Civil War, even as crude as they were, was remarkable as evidenced by the following results obtained:

UNION FORCES

Vessels striking mines	32
Vessels sunk by mines	27
Vessels sunk by gunfire	9

During the Spanish American War, mines were not used to any extent, but at the outbreak of the Russo-Japanese War both belligerents were equipped to use them. Of the total losses in this war the mine comes in for a very large share of the credit. The Russians lost heavily due to mines, but the Japanese losses from this cause were even greater.

JAPANESE LOSSES DURING THE RUSSO-JAPANESE WAR

Ships	Total No. sunk	No. sunk by mines	No. sunk other causes
Battleships	2	2	
Cruisers	6	5	1 sunk collision
Torpedo Boats	9	4	5 sunk gunfire

NOTE: This table gives only sinkings. Several other vessels were damaged by mines but were not sunk.

Could anything show more clearly the importance of mines than these results; yet little heed did the great powers pay, and in 1914, when the World War started not one of the warring nations was equipped with efficient mines.

MINES DURING THE WORLD WAR

At the outbreak of the World War and for several years previous Great Britain, Italy, and the United States were using the

same type of Naval Defense Mines, that is, the so-called Elia Mine. It was invented by Commander Elia of the Royal Italian Navy, and these three nations accepted this mine without giving it any tests worth mentioning.

It is hard to understand why as progressive a navy as ours could remain so long blind to the importance of mines, both as a defensive and offensive weapon, even after their importance had been brought out in the various wars in which the navies of the world participated.

In 1915, we at last began to realize the worth of mines and a separate force of the Atlantic Fleet was provided, known as the Mine Force. This Force consisted of the U. S. S. *San Francisco*, *Baltimore*, and *Dubuque* equipped as mine layers, four tugs as sweepers and the *Lebanon* as a mine carrier. This was the first real step taken by us in the study of mines and mining. The Mine Force worked hard until our entry into the World War and together with the Bureau of Ordnance, Navy Yard, Norfolk, Va., and the Naval Torpedo Station, Newport, R. I., did much towards the advancement of mining in our navy. All of the early work of our Mine Force was done with the Elia Mines, however, and it was not until after we entered the war with Germany that we turned our attention to the production of new types of mines.

Great Britain discovered about the same time we did, that the Elia Mine was of no use as a weapon and abandoned it. Admiral Viscount Jellicoe, in his book *The Crisis of the Naval War*, puts it very frankly when he says, "Unfortunately, in January, 1917, we did not possess a mine that was satisfactory against submarines. . . . and although we possessed in April, 1917, a stock of 20,000 mines, only 1,500 of them were then fit for laying." Realizing at this late date the inadequacy of their mining material, Great Britain frantically turned to the design and production of a suitable mine. A new model was designed following very closely the mines then in use by Germany, and quantity production was started at once. To this neglect of the science of mining by the British can be attributed, to a marked degree, the success of the German submarine campaign in the first three years of the war. It was not until October, 1917, that any of the new type of British mines, or until June, 1918, that any of the new type of United States mines were planted.

The opinion of the Commander of the U. S. Naval Forces operating in European Waters, as to the importance of mines, is shown by the following extracts from a letter written by him to the Bureau of Ordnance in September, 1918. "Mines are considered by the personnel of the enemy submarines as their most dangerous enemy because they cannot detect their presence. There is hardly any field which offers greater possibilities in the development of means to contain enemy sub-surface craft than mines. I desire to again emphasize the great importance of establishing a mining experimental station, as recommended in my cable,"—"It is my carefully considered opinion that mining is one of the most effective and most promising measures to defeat the enemy sub-surface craft, and that every effort should be made to insure maximum progress."

It is almost impossible to believe that such nations as were engaged in the World War could have neglected the development of mines, until after they had been fighting the Central Powers for several years, particularly since it had been proven that mines had almost unlimited possibilities, both as defensive and offensive weapons, as early as 1777.

Shortly after the entry of the United States in the World War, our Bureau of Ordnance began the development of a suitable mine for anti-submarine use. The result of this work was our present Mk. VI mine which was rapidly designed, experimented with, and produced in large quantities. About 100,000 of these mines were completed; 56,611 of them being planted by the United States Mine Force in the famous North Sea Mine Barrage.

Our Mark VI mine was a distinct forward stride in this line and while it was designed and manufactured with the utmost secrecy as to details of operation, its principle has been given to all of our Allies and information concerning it has been given to the American public through the press. Its range of effectiveness was infinitely greater than mines of previous design due to its having an antennae wire above it, which fired the mine if contact was made on any part of this antennae.

CLASSIFICATION OF SUBMARINE MINES

Since the mine has proven itself to be a most valuable weapon both for defensive and offensive use it might be well to consider

the various classes, the uses for which each are designed, and the various types of vessels fitted for laying them.

Submarine mines are divided into a number of different kinds. The two main classes are:

- A. Moored mines.
- B. Drifting mines.

Moored mines are subdivided into two classes,

- A. Contact mines.
- B. Controlled mines.

Drifting mines are subdivided into two classes,

- A. Fixed Depth mines.
- B. Oscillating mines.

Contact mines, or to be a little more specific, Self Acting mines, are those which are fired when direct contact is made with the mine case or some part of it such as a horn or antennae. This class may be subdivided into three types,

- (1) Electrical.
- (2) Mechanical.
- (3) Electro-Chemical.

In the first of these three types comes the much talked of antennae mine. It consists of a mine having a firing device contained in the mine case above which is suspended an antennae wire. Contact with the mine case or the antennae generates a current sufficient to operate the firing device. A special class of this type carries an antennae both above and below the mine case.

In the second type (mechanical) the firing of the mine is accomplished by a mechanical operation which takes place when the mine case comes in contact with an object.

In the third type (electro-chemical), comes the so-called horn mine. It was this type of mine which was principally used by all countries during the World War except the United States. The mine case carries several horns composed of lead, having glass tubes inside them. These tubes contain an acid which acts as an electrolyte for a battery. Each horn has its battery directly below this glass tube and when contact with the lead horn is made the glass is broken allowing the electrolyte to run into the battery and energize it, thus firing the mine.

Controlled mines are used principally by the army for harbor and coast defenses. They are divided into two types,

1. Moored mines.
2. Ground mines.

Both of these two types have the same arrangements for firing and differ only in the respect of anchors. The moored mines have a regular anchor with the mine case moored to it by means of a wire cable, while the ground mines have the mine case contained in the anchor; that is the whole mine rests directly on the bottom. In order to fire controlled mines a very elaborate system of submarine wiring is required. Three methods of firing are used.

First: By plotting the position of the enemy the mine or mines covering that position are determined and fired by closing a contact switch on shore.

Second: When the enemy makes contact with a mine a signal is made in the observation post and the firing switch for that particular mine is closed, thus firing it.

Third: The firing switches in observation post can be so arranged that when contact is made with a mine it fires itself. In this case the controlled mine becomes practically a contact mine.

The Drifting Mine is the second of the main classes of mines. It is subdivided into two types:

1. Fixed Depth Drifting Mines.
2. Oscillating Mines.

In both of these types the mines are free to drift and once layed, the control of them is lost. In the first of these types (fixed depth), the mine case has a small amount of negative buoyancy, about five pounds, and is supported by a line running to a buoy on the surface having about ten pounds positive buoyancy. In the second type the mine is made to oscillate between fixed limits of depth but never break surface. It gives no indication of its presence by buoys, etc. In Drifting Mines, firing may be accomplished by the same means as in the Moored Mines, that is, electrical, mechanical, or electro-chemical.

ADVANTAGES AND DISADVANTAGES OF EACH CLASS
MOORED MINES

Advantages:

1. They are inexpensive and readily manufactured.
2. They can be assembled and kept in store ready for use.
3. When issued to mine-layers for laying they require practically no specially trained personnel to lay them.

Disadvantages:

1. May be swept.
2. Not efficient in a current.
3. Are dangerous to own ships when once planted, (except controlled mines).

DRIFTING MINES

Advantages:

1. Of great tactical use particularly in case of a fleet engagement.

Disadvantages:

1. No control over them when once layed.
2. Thrown aside by bow wave of a ship.
3. Short life. (As limited by international agreement.)

The people working with the design of our mine material have, since the World War, endeavored to overcome the disadvantages of mines and at present we have some very promising designs which it is confidently believed will overcome practically all of the present disadvantages. Secrecy forbids giving any further details concerning these designs but at least those who are most interested in this work feel that they have at last developed something which will stand the hardest tests and will be able to score hits against a battle fleet.

TYPES OF MINE LAYERS

An article on the subject of Naval Mines would be incomplete without considering the several types of mining vessels. The so-called mining vessels are:

1. Mine-layers.
2. Light mine-layers.
3. Submarine mine-layers.

4. Mine Sweepers.
5. Mine Carriers.

Mine-layers should be large ships carrying 350 or more mines, and having as much speed as possible, but not less than 25 knots. For a large defensive mine project, where enemy craft are not expected to be encountered, converted merchant vessels make admirable mine-layers for they possess large carrying capacity. Light mine-layers are destroyers fitted to lay mines off enemy ports or drifting mines ahead of an enemy fleet. The World War proved that the most efficient mine-layer was the submarine. Mine sweepers should be developed to sweep at fairly good speed ahead of our fleet when required. Mine carriers may be merchant vessels used to transport mines from distant bases.

PRESENT DAY STATUS OF MINES AND MINING

Being once awakened to the importance of mines we have continued research and development work since the signing of the Armistice and today we have under way some of the most promising designs. For this design and experimental work there is at the Washington Navy Yard a very complete Mine Laboratory.

It is believed that if information concerning the various new types of mines, their uses, etc., could be given to every officer in the navy, great benefits would be obtained. How can we expect the senior officers of our service, the commanders of fleets, or various units of fleets, to be fully prepared to handle their commands in time of war if they have no idea of what to expect from mines? In this connection it is the belief of the writer that our commanders-in-chief at least, and possibly the commanders of control and base forces should have experienced mining officers on their staffs. It is believed that very little is known, not only of our various types of mines, but also of those of an enemy that might be encountered. How many officers of our service realize that it is perfectly feasible to plant moored mines in 500 fathoms of water; or that the paravane no longer renders a ship immune from mines? Lack of this kind of knowledge is not the fault of the individuals but of our own policy of too much secrecy.

After a period of almost 150 years we have at last recognized the importance of the mine as a naval weapon and have taken steps to perfect it. Assuming that our research, experimental and production work will continue, it now behooves us to turn some of our attention towards educating the officers of our Navy in the kinds and uses of mines.

DISCUSSION

Life Insurance as Applied to the Naval Service

(SEE WHOLE NO. 238, PAGE 2107)

LIEUTENANT C. K. BLACKBURN, U. S. NAVY, RETIRED.—Mr. Webb's article was a very valuable one and one which presented much information of interest to naval personnel. I cannot, however, allow certain statements in his article to pass without taking an opportunity to discuss them.

Although I am an Actuary of a Non-Participating company, I believe the Mutual companies to be acting in good faith and to be making a valuable contribution to Life Insurance as a whole. From Mr. Webb's article one would consider that Non-Participating companies or "Stock Companies," as he calls them, are not acting in good faith and are robbing the insurance policyholder because they do not give dividends.

It is true that a Non-Participating company does not give dividends as such. The Non-Participating contract provides protection at the actual flat basis of safety as determined from previous experience. Non-Participating rates as originally fixed are based on the previous savings on mortality, savings on expenses of operation, and probable future excess earnings on investments. Just as a basis of comparison I will quote the rates charged by one of the best Non-Participating companies for the contracts mentioned in Mr. Webb's article:

<i>Non-Participating or "Stock Companies"</i>	<i>Rates—Mr. Webb's Article</i>
Straight Life .....\$15.10	\$18.28
Endowment at 60 20.96	24.64
20 Payment Life 22.53	26.48
30 Year Endowment 24.94	28.74
20 Year Endowment 40.51	44.84

The Participating company equalizes the original difference between their rates and those of the Non-Participating company by means of dividends. Such dividends are the earnings for the previous year and are based on the savings on mortality, savings in expenses of operation and excess earnings on investments during that year.

I disagree most thoroughly with Mr. Webb's recommendations for the Straight Life contract as the best form of contract for the naval man. It is true that the actual annual cost to the individual is the least. Premiums under the contract are payable throughout the lifetime of the insured. At no time during the duration of a contract does the cash value increase

between anniversaries by an amount equal to or greater than the premium. The burden of premium payments under the Ordinary Life contract becomes excessive as time passes. A limited Payment Life contract, on the other hand, provides for payments for a certain stated number of years and the insured can count on being relieved of this burden at its conclusion.

The insurance companies of the United States have done their best to equalize commissions on the various forms of contract so that no insured would be urged to take a contract which was not satisfactory to his needs. At the present time the amount of commission received on the different contracts is so very nearly the same that it does not pay an agent to secure an application for a contract which is not fitted to the need of the applicant. Many agents are known to specialize; some on Ordinary Life prospects, some on Limited Life prospects, and still others on Twenty-Year Endowment prospects. If there were a decided inequality in the commissions paid the agent under these forms of contract all agents would try to specialize on the higher premium forms.

I might go on to discuss in general the various forms of contract listed in Mr. Webb's article. No insurance man is capable of knowing which contract is most suitable and most satisfactory for the entire naval service. I remember distinctly that the easiest way for me to save while I was in the service came from certain definite and stated payments for Liberty Bonds. I can well conceive that for certain people an Endowment policy would be equally satisfactory.

The fact remains that each individual must settle what form of contract is most satisfactory for the needs which he desires to provide for. I can only say that I should have too much consideration for my clients to even suggest that a man above thirty-five years of age should take out an Ordinary Life contract. At the younger ages this form of contract is fairly satisfactory. As the age increases its value becomes less.

The Monthly Income contract is very satisfactory if the individual can afford a sufficient amount to give a satisfactory income. The amount of insurance necessary to provide \$100 a month for twenty years is about \$17,300. Such a monthly income should be the minimum provided. If the individual cannot afford this amount of insurance I am inclined to favor the lump sum method of settlement.

In conclusion I should advise all officers to choose their own insurance forms basing their decision on:

1. Whether they desire to pay for protection their entire lifetime.
2. Whether they desire to pay for protection for a limited period.
3. Whether they desire to pay for protection and savings simultaneously.

If the first is desired, choose an Ordinary Life contract; if the second, a Limited Payment Life contract; and if the third, an Endowment contract.

A Program for Naval History

(SEE WHOLE NO. 232, PAGE 973)

CAPTAIN J. M. SCAMMELL, INF. R. C., U. S. ARMY.—Since I prefer not to go down on the records of the Naval Institute forever as being guilty of "gross ignorance" in an article, or as having been guilty of insulting by wholesale a group of hard-working and sincere officers, may I be permitted to clear up some misunderstandings regarding my article on "A Program for Naval History" which appeared in your June number and upon which Captain Robert H. Woods commented so vigorously in the September issue?

I have made clear my point of view—I believe to his satisfaction—to Captain Woods; I should like similarly to make it clear to your readers.

In the first place, I understand perfectly well that the Rebellion records are not designed to be history, but only material for the use of historians.

I made a very serious error, not in fact, but in rhetoric: I forgot the injunction of Quintilian, that one should write, not so as to be understood, but so that one could not be misunderstood: When I said "One collection bears this notice 'Edited by the clerk of the joint committee on printing,'" I referred, not to the Rebellion records, but to "the manner in which *such things are done* by our government."

In criticizing the editing of the records, I judged the scholarship by present-day standards, and the advance that has been made since the Civil War is enormous. To have done this was, perhaps, unfair. Doubtless in their day the men to whom Captain Woods refers were among the most distinguished of their time.

But none of these considerations affect the actual present-day value of the work. My criticism, however, does not represent my own personal point of view alone. I have heard the undertaking criticized for years. In fact, within the last few days I have noted the following comments:

1. Colonel John R. M. Taylor, U. S. A., in the *American Historical Review*:

"The Rebellion records are not only not history, but they are hardly a model to be followed."

2. Captain Alfred Dewar, R. N., in the *Journal of the Royal United Service Institution*, August, 1921, uses almost the same words:

"Not an example to be followed."

3. The late Professor R. M. Johnston—whose reputation as a judge is secure—in the September-October, 1912, *Infantry Journal*:

"It is perfectly well known among historians that the War Records fail to satisfy the standard in several particulars, and, invaluable though they may be, are a monumental example of how not to spend good money and how not to do a piece of work."

Of course, in attributing the defects to politics I may have jumped at a conclusion that was unwarranted; but at least, it was a perfectly natural one.

Employment and Tactics of Aircraft in Naval Warfare

(SEE PAGE 1263, WHOLE NO. 234)

COMMANDER H. D. COOKE, U. S. NAVY.—I. In the article on the "Employment and Tactics of Aircraft," by Commander J. P. Jackson, the concluding remarks are devoted to the control of operations from the air. The author states that, under proper conditions, a Commander-in-Chief would have a decided advantage in handling a fleet from a dirigible, but that, on account of the vulnerability to airplane attack and the inherent weaknesses in the design of modern airships, a Naval Commander would not be justified in separating himself from his fighting forces.

2. It requires no argument to convince officers who have worked with the game board, or those who have taken part in fleet maneuvers, that a dirigible would afford an ideal position from which to direct the movements of surface craft, providing the weather is clear. While it appears possible to give adequate protection by the use of our own fighting planes, the main difficulty seems to depend upon the questionable ability of such aircraft accompanying the fleet during extended cruises at sea.

3. Commander Jackson also states that, although dirigibles have a large radius of action, they must rely upon a shore base for gas, supplies, and as a place to secure. If this remains true, the future usefulness of this type of aircraft to the fleet will be seriously curtailed. However, although the writer acknowledges a very limited knowledge of aeronautics, the feasibility of towing a dirigible from a surface vessel, to economize fuel and gain a source of supply, does not seem to present insurmountable obstacles.

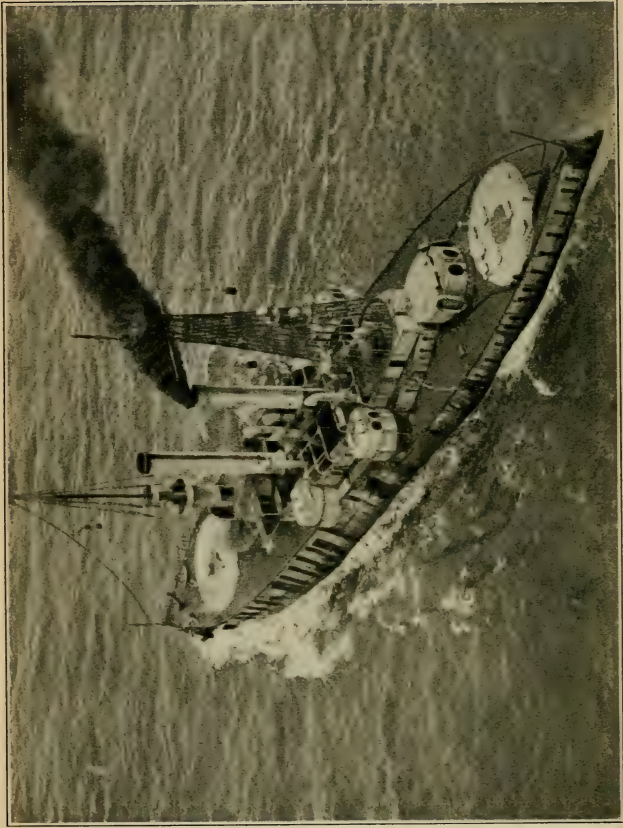
4. If this can be accomplished, under varying weather conditions, it should be no great feat to refuel and replenish a dirigible, as required, from the towing ship, and make her one of the fixed units of the fleet, ready to cast off and operate independently on scouting or other duty. Such an arrangement would require some means of transfer of personnel, but it is believed that this problem can also be satisfactorily solved.

5. With a dirigible attached to his flagship, a Commander-in-Chief could take to the air or not depending upon conditions. If the weather is fine, he should be able to control all of his forces by means of radio communication from a dirigible, free to cruise in any direction, as readily and accurately as could be done on the game board. If, on the other hand, the weather is thick, he would probably elect to remain on his flagship, depending upon an experienced officer of his staff to cruise over the battle area and give what information he can obtain of the disposition of forces and progress of the engagement.

6. Considering a helium filled dirigible, and a number of fighting planes acting as an aerial defense, in addition to the anti-aircraft guns of the fleet, it appears that an airship of this type could be made reasonably safe for the Commander-in-Chief during battle. Even should the experiment prove hazardous, would not the probable initial advantage gained, which is

all important in naval battles, more than offset the disadvantage of placing the Commander-in-Chief in jeopardy during the later stages of the engagement?

7. A number of articles have recently appeared recommending various locations for the Commander-in-Chief in battle. These remarks are, therefore, submitted as an argument for an aerial flagship, in a belief that future development will result in surface fleets being controlled largely, if not entirely, from the air.



U. S. S. "IOWA" AS SHE APPEARS TODAY, EQUIPPED FOR RADIO CONTROL
The *Iowa* will be used as a target by the fleet in the Bay of Panama about March 26, 1923.
(Note.—Comparison of this photograph with that of the U. S. S. *California*, the frontis-
piece of this issue, will prove interesting. Both were taken from the air.)

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER F. W. ROCKWELL, U. S. NAVY

and

LIEUTENANT J. B. HEFFERNAN, U. S. NAVY

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GREAT BRITAIN

HAVE WE ENOUGH SUBMARINES?—"Submarines were the first at sea on the outbreak of war, they have been continuously in action while it lasted, they will be the last to return to harbor. You have, in addition to the invaluable outpost, patrol, mine-laying, fleet duties, and other services, the sinking of fifty-four enemy warships and 274 other vessels to your credit, and you have done more to counter the enemy's illegal war upon commerce than any other means. . . ." These extracts from the message addressed after the armistice to all boats by the then Comodore of Submarines—now Rear Admiral S. S. Hall—should be quite sufficient to dispose of the idea, which many people still entertain, that our submarine service played a negligible rôle in the Great War. They serve also to correct the equally fallacious assumption that the underwater boat will be more or less useless to the British Navy in its future work. This wrong impression was unfortunately conveyed to the public by certain speeches of the British delegates at the Washington Conference, when they were attempting to secure the total abolition of the submarine. But naval men and all who have studied the history of the Great War are well aware that our submarines not only rendered magnificent service to the Allied cause, but that they are certain to prove of still greater value if we ever have to fight at sea again. Because the Germans employed their U-boats almost exclusively for commerce destruction it has been hastily assumed that the submarine is good for little else. The publication of the recent Admiralty memorandum to New Zealand on naval policy, in which the building of submarines was urged upon that Dominion, has therefore caused some surprise, and people have been asking why the Admiralty should recommend the construction of vessels which they had

previously declared to be valueless for British naval purposes. The answer is, of course, that the Admiralty made no such declaration, that the speeches at Washington, in which the submarine was branded as a murderous weapon, only useful for illegitimate methods of warfare, were delivered by laymen who spoke without technical knowledge of the subject, and certainly without the inspiration of their naval advisers.

Apart from its value as a tactical unit operating against the surface warships of an enemy, the submarine has demonstrated its high efficiency for reconnaissance, patrol, escort, and counter-submarine work, so much so that in any future war in which our communications were seriously threatened there would be an urgent demand for many more boats than would probably be available. To carry out effectively the duties we have mentioned, good sea-keeping qualities and wide radius of action are essential for which reason the trend of development is toward larger displacement and improved habitability. Our boats of the *L* class appear to represent the smallest type which could be usefully employed on the ocean-going duties likely to devolve upon British submarines in future wars. The small coastal boat which enjoyed such a vogue some years ago is now obsolete so far as we are concerned, for it has come to be recognized that our submarines, like other ships of the King's Navy, must be prepared to do their work in all waters and not be tied to their home coasts. Accordingly, scores of our smaller boats have been scrapped, and in the interests of economy many others of ocean-going dimensions have been discarded. As the gaps thus left have not been filled by new construction our submarine fleet is now comparatively weak. At the close of the financial year there will remain only fifty-eight boats, including eighteen in reserve. There are, besides, six boats in Australia, all of which are out of commission. The two small submarines of the Canadian Navy are understood to have been placed on the disposal list.

At the date of the armistice we had seventy-three submarines under construction, of which number thirty-three were cancelled forthwith. The United States and Japan also had big programs in hand, but they did not follow our example. The result is that while both Powers have been steadily building up their submarine fleets since the war, we have been steadily reducing ours. During the past four years the United States has authorized or laid down thirty-three boats, Japan has begun at least thirty-five boats and authorized twenty-four more, and Great Britain has authorized and laid down one boat. Consequently, when the various programs have matured, we shall have only one submarine that fully embodies the technical improvements suggested by war experience, while the United States will have thirty-three and Japan fifty-nine. Numerically the United States is now the leading Power as regards submarines, for she has 124 boats built and building, exclusive of twenty-two obsolete craft which have recently been condemned for scrapping, and fifty-six of her boats are suitable for long-range work. Of the British total of sixty-four (including the six Australian boats), about forty belong to the genuine ocean-going type. Japan is particularly strong in submarines of this type, as eventually she will have between sixty and seventy boats with cruising radius of 5,000 to 12,000 miles. These figures suggest that if the submarine is as valuable for general naval purposes as most experts believe it to be, our underwater fleet needs to be reinforced without delay. It is true there is some vague talk across the Atlantic of summoning a second conference to restrict the output of submarine tonnage, but there is no reason to suppose that a second attempt to achieve this object would prove more successful than the first.—*Naval and Military Record*, 8 November, 1922.

LABOR AND DEFENSE.—It is not easy to forecast the influence which the presence of a strong Labor bloc in the House of Commons will exercise on defense policy. Ever since the Labor party became a political factor to be reckoned with it has leaned toward pacifism, and, with rare exceptions, opposed the provision of adequate national armaments. Some years ago, indeed, Mr. Arthur Henderson declared on a public platform that "the Labor party was the 'little Navy' party, and was not ashamed of the nickname." But we doubt whether Mr. Henderson would have had the courage to repeat that confession in the early months of the war, when only the British Navy stood between the Kaiser's legions and the dominion of the world. Labor hitherto has opposed armaments on two grounds—first, because they are a menace to democracy, and, secondly, because they fill the pockets of the capitalists.

Both reasons, however, are fallacious—in this country at any rate, whatever may be the case elsewhere. To assert that the British Navy or Army has ever been used to suppress or hamper the legitimate aspirations of any section of the people is to assert what is demonstrably false. On the contrary, British arms have repeatedly been employed to defend the liberties of the people, and without them the world today would unquestionably be under the iron rule of a military despotism. With regard to the charge that armaments are only profitable to those who manufacture them, we have the *obiter dicta* of Mr. R. B. Cunninghame Graham, one of the Socialist "intellectuals," who once wrote in the *Saturday Review* as follows: "After all, what is a Dreadnaught but a swagship, whether in England or in Germany? Swag in the contract, swag in the material of which the ship is built, in every link of the chain-cable; swag from truck to keel. Build eight, build ten, build twenty Dreadnaughts, whether at Portsmouth or at Kiel; the object of their building will be swag."

It is curious that those who claim to be selfless idealists should generally be the first to impute dishonest motives to their fellow men. Before committing himself to the statement quoted above, Mr. Graham might have taken the trouble to explore the economics of the question. Had he done so he would have found that there is less money in warship construction than in any other branch of shipbuilding. He would have found, too, that an overwhelming proportion of a warship's cost is paid out in wages. If, therefore, such vessels are built for swag, a goodly portion of it is shared by the workers themselves. Mr. Graham would also find food for thought in the present attitude of the Labor party toward the new battleship program and naval policy in general.

We venture to say that no party has been more insistent than Labor in encouraging, both by direct and indirect political pressure, the building of these two new ships or in resisting such measures of retrenchment as the closing of superfluous establishments and the reduction of dockyard and arsenal staffs. Have its motives in this case been altogether free from the mercenary taint? For our part we do not think that Labor control in this country would necessarily involve the neglect of national defense. The rank and file of the party have often shown a sounder grasp of realities than their leaders. It was the masses who in the critical years before the war insisted on the Navy being kept strong enough to face the German fleet, when the political chiefs of more than one party were inclined to wobble. Let any visible menace confront Britain and the workers will always be found rallying round the old flag, which, as they well know, is still the emblem of the world's truest and greatest democracy.—*Naval and Military Record*, 22 November, 1922.

ARMY AND NAVY EFFICIENCY.—Dealing with the importance of being prepared for sudden emergencies, such as arose out of the Near Eastern crisis a few weeks ago, one of the London papers argues that, although our fighting forces have been much reduced, they are far more powerful and efficient in proportion to their paper strength than was the case before the Great War. This assertion may pass with the general public, but it is likely to be challenged by service men. That the Army of today can develop more offensive power per unit than was possible eight years ago is true enough, this being the result of improvements in material, but so far as personnel is concerned a great majority of our troops have not yet served sufficiently long to acquire that degree of training and that superb discipline which made the "Old Contemptibles" so formidable in the field.

As for the Navy, our modern ships are, of course, better armed and better equipped in every way than their predecessors of 1914, but that the fleet as a whole is more efficient now than then is open to doubt. Large numbers of the most experienced officers and men have left the service; the economy program, by reducing the number of ships in full commission and cutting down the fuel allowance, has made it impossible to carry out fleet exercises and training on anything like the pre-war scale, so that the all-round efficiency of the fleet as a tactical unit has inevitably suffered some decline. Even the fully-commissioned ships, if not actually short-handed, have complements much smaller than war experience indicated as necessary, and those of the Atlantic Fleet carry a large proportion of boys and seamen who are still in the early stage of their training. The same conditions obtain to a greater or less degree in the United States Navy, where, indeed, the percentage of "green" ratings is understood to be considerably higher than in our service. The only navy which probably shows an absolute gain in general efficiency as compared with the pre-war standard is that of Japan, where there has been no great exodus of trained officers and men, where war lessons have been embodied in material and equipment, and where exercises of every description are carried out on a larger scale than was customary before the war.—*Naval and Military Record*, 8 November, 1922.

SUBMARINE SERVICE.—The Admiralty have just notified a number of amendments to King's Regulations and Admiralty Instructions. One of these announcements states the junior officers for the Submarine Service will be selected from sub-lieutenants and junior lieutenants who volunteer.

Applications to specialize in submarines, it is notified, should be accompanied by a certificate from the medical officer of the candidate's ship, stating that he is physically fit for such service. The applications should be forwarded to the Admiralty, through the usual official channels, duplicate copy being sent to the Rear-Admiral (S.) Sub-lieutenants who have not obtained their watchkeeping certificates prior to joining the Submarine Service may obtain them in that Service.

A larger proportion of junior officers is required in the Submarine Service than of more senior lieutenants and lieutenant-commanders. In consequence, the appointments of junior officers to submarines will be for three years in the first instance, after which they will return either temporarily or permanently to the general service. Before returning to general service the officers will be eligible to volunteer to specialize in submarines, gunnery, torpedo, navigation, etc. Those who volunteer and are selected for submarines will be definitely earmarked for that service, and after one year in the general service will return to the Submarine Service, and from that time will be regarded as specialists in that service and will only revert to the general service under the same conditions as

other specialists: viz., in consequence of promotion, at own request, for unsuitability, medical unfitness, misconduct, or lack of suitable submarine appointment owing to age and seniority.

On attaining about eight years' seniority as lieutenants, submarine specialists will be sent to seagoing ships for general service experience for a period of approximately two years, afterward returning to the Submarine Service.

Submarine specialists will receive equal consideration with other specialists in regard to promotion.

Service in submarines in the junior ranks provides excellent training for officers who ultimately desire to specialize, and is a good preparation for service in destroyers on return to the general service.

Allowances are payable for service in submarines on the scale laid down in Art. 1372.—*Naval and Military Record*, 29 November, 1922.

BUILDING FOR FOREIGN NAVIES.—The fact that Brazil is to have her fleet reorganized by a naval mission from the United States has given rise in some quarters here to gloomy talk about the waning of British prestige among the smaller maritime States, most of whom used to come to us for assistance whenever they wished to develop their naval power. It must not be forgotten, however, that the growth of American influence in Brazilian naval circles dates back to the days of the war, when the preoccupation of Great Britain with her struggle for existence left her no time to think about her future interests in South America. In 1917 the Brazilian Government decided to have the battleship *Sao Paulo* thoroughly overhauled, and as it was impossible, for obvious reasons, to get the work done in Europe, the vessel was sent to New York Navy Yard. Two years later the Washington naval authorities invited Brazil to send this ship to exercise with their Atlantic Fleet, and, as the invitation was accepted, it was only natural that certain Brazilian officers should become permeated with American ideas.

A sister ship, the *Minas Geraes*, was also refitted at New York at a cost reported to be as high as £2,000,000. It is probable that other units of the fleet will be similarly treated, though British firms are still hopeful of securing the contract for modernizing the cruisers *Bahia* and *Rio Grande do Sul*. That the presence of Admiral Vogelsang and other United States Officers at Brazilian naval headquarters will bring any lucrative orders to American shipbuilders is by no means certain. So far as is known, Brazil's new naval program is limited to a few submarines, the reconstruction of old ships, and the extension of base facilities. No new ships of large size are contemplated at present.

Should any of the smaller naval Powers decide to order new ships, there will be very keen competition for the work between British and American firms. There is nothing to show that current shipbuilding costs in the United States are lower than those prevailing here, and the old British reputation for good workmanship has certainly survived the war. Prices have probably come down a little since last year, when it was reported that an order for two large Japanese cruisers had been lost owing to the fact that the lowest British tender was appreciably higher than the average price quoted by Japanese firms.

It is a long time since the last foreign naval contract found its way to this country, though in pre-war days our yards were rarely, if ever, without such work. For example, on the outbreak of war we had the following orders in hand: For Chile, two battleships of 28,000 tons and three large destroyers; for Turkey, two battleships of 27,500 and 23,000 tons, four large destroyers, and several patrol craft; for Norway, two coastal ironclads of 4,900 tons; for Greece, two light cruisers of 5,250

tons; for Brazil, three river monitors of 1,200 tons. There were, besides, torpedo craft on the stocks for Japan and Portugal, and other foreign contracts were known to be impending.

All the vessels enumerated were requisitioned by the Admiralty, and thus made a powerful reinforcement for our own fleet. The construction of warships to foreign account is a branch of work which has always been particularly welcome to our shipbuilders, who have found it more profitable than Admiralty contracts. It is to be feared, however, that little will be doing in this line for some years to come, since most of the States now increasing their navies are able to do so from their own resources.—*Naval and Military Record*, 29 November, 1922.

CRIPPLED FLEETS.—A striking example of the evil results that attend indiscriminate retrenchment in the sphere of defense comes from the United States, where the Navy, according to statements appearing in responsible American journals, has been well-nigh crippled by the drastic reduction of personnel. We reproduced last week an article from the *Scientific American*, which contained some sensational facts bearing on this subject, and there is every reason to believe them authoritative. They point a moral which our own too-zealous economists should take to heart. Nearly a year ago the anti-waste party in Congress tried to cut down the number of seamen in the Navy to 67,000. This attempt was not altogether successful, but in spite of assurances by naval experts, supported by incontrovertible evidence, that 96,000 was the smallest number of men required to maintain the fleet at a degree of efficiency characterized as only "fair," Congress refused to appropriate for more than 86,000. What has been the result? If the American Fleet were called upon to engage an enemy tomorrow, it would go into action with reduced complements. Of trained gun numbers each ship has only enough to man one broadside, so that, although the main armament might be fully effective, half the secondary guns would be silent. Even with most of the guns in action, however, their rate of fire would be slow, as there are not sufficient men available to keep the ammunition supply up to the maximum necessary for sustained rapid fire. Thus the fleet would be handicapped in a most vital respect, for, once battle has been joined, the issue is mainly dependent on gunnery. Speed, another supremely important factor in war, is also affected by the shortage of personnel, for if the gun crews and ammunition parties were to be reinforced in order to keep the armament fairly in action, the men in the engineering department would be so reduced that full speed could be maintained for no longer than two watches. The continuous speed of the battle fleet would fall from twenty knots to ten, and that of the destroyers from thirty-five knots to fifteen.

This would be serious enough in any circumstances, but considering that the American Fleet, if it has to fight at all in the near future, will fight in the Pacific, where the distances are immense and the strategical conditions such that long periods of steaming at full speed would have to be undertaken by all units of the fleet, inability to do this might well prove disastrous. Even under peace conditions the dearth of men is gravely hampering training and exercises. Ships are unable to remain at sea as long as formerly; target practice has had to be curtailed, and the whole organization on board suffers from the frequent withdrawal of men from one duty to perform another. It would appear that Congress has also cut down the appropriations for fuel, practice ammunition, and other supplies essential to the proper conduct of fleet training. Added to these drawbacks is the well-known fact that most of the men leave the service as soon as their first term of enlistment is up, preferring

to take their chance in civilian life rather than make a career of a service the future of which, owing to the shortsighted economy of the legislative bodies, is uncertain and unpromising. The Navy Department, which has meanwhile brought its administrative and operating costs down to the lowest figure possible, is now asking for a seaman personnel of 96,000 as the absolute minimum consistent with the maintenance of the fleet at a reasonable plane of efficiency. Unless the proposed increase of 10,000 men is sanctioned it will be impossible, according to expert opinion, to keep the United States Navy up to the level of power prescribed by the Limitation Treaty, and its actual fighting strength would then be little, if at all, superior to that of the Japanese Navy.

It would be instructive to have an equally frank exposition of the existing state of affairs in our own Navy. We have fewer battleships in commission than the United States, and our destroyer and submarine flotillas are also smaller; but against this we are maintaining a greater number of ships on foreign stations. In the Atlantic Fleet the complements of ships are now 15.7 less than war experience showed to be desirable; and a large percentage consists of ratings still in the early stage of training. The Mediterranean Fleet is also working with reduced complements, and the same is true to a greater or lesser degree of every other unit in commission. It is, therefore, probable that our Navy as a whole has to contend with much the same difficulties as those which beset the American Fleet. The scrapping of ships condemned under the Limitation Treaty will make very little difference to personnel requirements, most of these vessels having already been paid off. The establishment, which in 1918-19 stood at 381,311, will have been reduced at the end of this financial year to 98,500, a total that includes Royal Marines, Coast-guard, boys under training, and naval cadets, so that the net total available for manning is considerably smaller. The American establishment, on the other hand, includes 86,000 "enlisted men," all available for manning, and does not include the Marine Corps, which has an authorized strength of 20,000. Thus, even if the American naval personnel is not increased, it will still remain larger than ours, and our Navy has consequently fallen below that One-Power Standard which we are supposed to be maintaining.—*Naval and Military Record*, 29 November, 1922.

FRANCE

THE FRENCH ARSENALS.—The debate in the Chamber of Deputies upon the reorganization of the arsenals, whereby it is hoped to realize economies of thirty to thirty-five million francs a year, has enabled the Minister of Marine to explain the policy of the Government, which aims at concentrating effort upon the two leading arsenals and utilizing the others in association with private shipyards, so that they may be readily organized in time of war. The idea of handing the arsenals of Lorient and Rochefort over to private firms has been abandoned for the time being through the failure to obtain suitable offers. The arsenals that are to be kept in a high state of efficiency are Brest and Toulon. Cherbourg and Bizerte will become naval bases, and the other arsenals will be regarded as auxiliaries which will be just kept going so that they may be utilized in time of hostilities. The slips for the construction of submarines will be maintained at Cherbourg, and the number of hands at Bizerte will be reduced to what it was before the war, while at Lorient it is intended to make more profitable use of the high-class plant and machinery with which the port is equipped. Rochefort will be suppressed and the Guérigny armor plate and chain works, which have been closed down since 1919, will be made over to private enterprise if an acceptable offer is forthcoming. No more armor plates will be required, as the 8,000-ton cruisers

under the new program will be built for speed and will have no protection, and the chain manufacture will be transferred to Indret. In a word, the State has no longer the intention of running the arsenals in competition with private industry, but, except in the case of Brest and Toulon, will use them mainly for repairs and other work, and also for organizing the private industry in time of war.—*The Engineer*, 1 December, 1922.

PRESENT FRENCH NAVAL POWER.—The loss of the battleship *France* has called public attention to the present position of the French naval power, which is declared to be comparatively lower than it has ever been since the beginning of the last century.

Leaving out of account certain units which are now out of date and are retained only on account of French naval poverty, the French Navy is reduced to six dreadnaughts, five light ex-enemy cruisers, thirty-eight torpedo-boat destroyers, of which ten are ex-enemy, and forty-one submarines, of which ten are ex-German. For the rest, there are three battleships of the *Voltaire* type (18,300 tons), ten old armored cruisers of the *Montcalm-Michelet-Quinet* type, a dozen old torpedo-boat destroyers, and an equal number of antiquated submarines.

Moreover, coast defense against an enemy at sea is said to be non-existent, since the old heavy batteries scattered along the coast line have a range of scarcely more than $6\frac{1}{4}$ miles, while the guns of a modern battleship carry from 20 to 25 kilometers ($12\frac{1}{2}$ to $15\frac{1}{2}$ miles). Again, the position of French naval aviation is far from satisfactory, since the greater part of the seaplanes constructed during the war are no longer serviceable, and Parliament has not yet voted the credit for their renewal.

Frenchmen are, indeed, asking themselves whether it would be possible to protect their maritime communications in the event of a renewed conflict with Germany, and the present state of the French Navy is compared unfavorably with that of Italy. The taxpayer is therefore called upon to face the situation courageously and make the sacrifices necessary to re-establish French naval power on a satisfactory basis.—J. B. H.

FRANCE DELAYS RATIFICATION OF NAVY PACT.—Paris, December 2.—Hostility toward the ratification of the Washington naval agreements in the Foreign Affairs Committee of the French Chamber of Deputies, placing Georges Mandel, reporter of the commission, on the minority side, was responsible for the resignation of M. Mandel, former chief of Cabinet under Clemenceau, from the commission.

While M. Mandel himself refuses to be quoted as to the circumstances leading to his resignation, it is known that the committee rejected his report, recommending ratification by a vote of twenty-six to sixteen, with two members absent.

Premier Poincaré and Ex-Premier Briand were among the minority which favored immediate action on the Washington treaties.

The refusal of the commission to recommend unqualified ratification of the Washington treaties is not interpreted in parliamentary circles as involving disapproval of the principle of the agreement. It is looked upon as a question of interior policy which will be taken advantage of in an attempt to defeat former Premier Leygues as president of the Foreign Affairs Commission when officers are re-elected next January.

As matters now stand, it seems probable to parliamentary circles that there will be a majority in the commission favorable to ratification with a reservation allowing France full freedom of action in building capital

ships "as the necessity to protect the French colonies may demand."—*Baltimore Sun*, 3 December, 1922.

FRENCH NAVY NOTES.—The brisk training at sea both in the North and in the Mediterranean, the initiative and pushfulness of Sea-front Commanders Schwerer and Barthes, who are trying hard to transform their landlubbers' jobs into active sea duties, are the only gratifying items in the naval situation. Stagnation and inertia prevail both in Parliament and at Rue Royale. Bolshevik députés, though they vote against Army and Navy expenditure, are allowed to pour at length indignation and tears over the intended (for the last thirty years) suppression of State arsenals and of arsenal workmen, but this will not prevent Frenchmen claiming that they are *le pays du bon sens*. Admirals, of whom there are nearly three dozen on shore and eight at sea, are extremely busy piling reforms upon reforms and discussing momentous naval matters; and the Ecole Navale at Brest is celebrating its *triomphe* and sailing in reconstituted vessels of ancient architecture of those times when the French Navy was, with the English, supreme on the water.

The laying down of two British 35,000-ton battleships (that will in reality be 40,000-ton mastodons at full load), whilst exciting not the least bit of envy or anxiety, is nevertheless giving rise to interested comments in naval circles, as it throws a light on the true opinion of the London Admiralty as to the actual fighting value of the battleship. Paris constructors, who studied the methods and achievements of Sir E. H. T. d'Eyncourt in the mighty *Hood* and other bulge ships, and who, besides, have conducted experiments of their own, have arrived at the conclusion that British constructors have come much nearer to the solution of the problem of battleship insubmersibility, all the more so as the great come-down in speed, from 32 knots in the *Hood* to 23 knots in the new ships, shows that defense will absorb an unprecedented share of the total displacement. They also believe that the new British super-Dreadnaughts will mark a new departure in the distribution of armor, to be very thick on decks and to sink very low under the waterline, so as to afford protection against aerial bombs and torpedoes as well as against oblique hits. It will be a reminder of the ideas that presided thirty years ago over the designing of the Italian *Italia* and *Lepanto*. With the exception of the *Hood*, British mastodons in project will outclass all the exceedingly vulnerable (to bombs and aerial torpedoes) Dreadnaughts and super-Dreadnaughts of today. Britain leads.

The recent tempest in the Channel gave rise to useful lessons from a naval standpoint. German-made destroyers, though they have many good points on paper and are more powerfully armed than French types of similar tonnage are decidedly inferior in sea-keeping qualities and all-round robustness, and are far from having been as carefully designed in regard to stability and buoyancy and comfort on board. They are top-heavy, and dangerously so when fuel supply is getting low, while having insufficient freeboard amidships and aft. And yet with their high, robust bows they cannot be termed fair-weather boats, but the right description of them is that they are more military, more gun platforms, than naval seagoing craft. They were designed and built hastily with a view to short operations in the North Sea, and to short life; and the more they are tested and examined, the more regret is felt at the amount of time and money wasted in patching them up for prolonged service in the French Navy. And the same is true of German submarines, they too hastily built for short war service. When the breakdown in the Channel of the 280-ton *Morillot* is examined, another lesson is to be derived: namely, that French officers and crews are not quite at home in enemy quarters.

In truth, the comparative experience the French Navy has gained with German-built torpedo craft will have been of greater value to the constructor than to the seaman; its benefit will be felt a few years hence, when the eighteen destroyers of 2,500 and 1,425 tons just ordered will enter the service. The test of the real thing, especially in the Adriatic, though it is a narrow sea, has made it clear to our admirals that the twenty *contre-torpilleurs* of 800 to 900 tons, built before the war, though carefully designed and built and excellent for coastal duties, are little more than make-believe instruments de combat for high sea warfare. Admirals de Lapeyrère and Dartige du Fournet had no end of disappointment with their destroyers, robust enough so far as the hull is concerned, but with delicate and fragile motors, unequal to the wear and tear of prolonged war service. At one time Admiral Dartige du Fournet complained of only having two destroyers on which he could rely; and several units, of which *La Faulx* of 800 tons and 33 knots, (rammed by the *Mangini*), were lost as the result of sudden breakdowns. Hence, the after-war demand for larger and stronger *contre-torpilleurs*, made not for show and for paper utilization of the displacement, but for rough ocean work. The 1,425-ton *torpilleurs d'escadre* now building, are only designed for 32 knots, but they will have cruiser standard of constructional strength in all vital respects, as the result of recent progress in the manufacturing of high tensile steel, while carrying at good elevation a light cruiser armament of four 5.1-inch guns. They mark, and the 2,500-ton *contre-torpilleurs* still more so, a considerable advance in destroyer construction, and they will by 1925 cause France to regain the lead over Italy for that class of vessels, at least if the revolutionary Italian Government does not proceed with its rumored plans of naval extension.

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The comprehensive lesson of the *Goeben* and *Breslau* affair is the one the French Navy has taken most at heart. It demonstrated the superlative strategic value of speed: the results of that demonstration are embodied in the 8,000-ton and 34-knot cruisers now building, as well as in the 36-knot destroyers of 2,500 tons. The value of coastal points *d'appui*, shown by what Bizerta could have done and did not do, is at the root of the actual much-criticized coastal organization and of the coastal maneuvers that are *à l'ordre du jour* in France, both in the Channel and in the Mediterranean. Unlike his predecessors, our present Commander-in-Chief dislikes having his cruisers and destroyers tied to his battleships, well aware that his armored force is best defended against mosquito attack by an extended screen of small unit commanders utilizing their full initiative with a view to hunting down and destroying the enemy. Hence the many independent cruises by destroyer and submarine groups in the Mediterranean. Not to literally and blindly obey orders, but to destroy the enemy is the rule, and it was the Nelson rule. It is not the letter that matters, but the spirit.—J. B. Goutreau in the *Naval and Military Record*, 15 and 22 November, 1922.

GERMANY

THE GERMAN NAVAL ANNUAL.—While in England the leading work of reference for sea affairs, *Brassey's Naval Annual*, kept going except in the years 1917-18, the corresponding volume in Germany, *Nauticus*, has not appeared since 1914. It is therefore interesting to learn that a new issue is promised in April, 1923, the seventeenth. The former volumes of *Nauticus* were issued under the auspices of the German Navy Office, and came under the direct inspiration of Admiral von Tirpitz, whose personality was supposed to be covered by the pseudonym of

"Nauticus." The 1914 edition had a political and international survey, records of the German and other Navies, chapters on ordnance, mining, armed merchantmen, the military and legal aspects of blockade, shipbuilding and the mercantile marine, with many statistics. The Navy Office (*Reichsmarine-amt*), within which the book was edited up to the outbreak of war, no longer exists under the same name, and what authority the new *Nauticus* will possess does not seem to have been announced. It will presumably be more largely concerned with the mercantile marine and the economic conditions of oversea trade.—*Army, Navy, and Air Force Gazette*, 18 November, 1922.

WHAT AND HOW GERMANY HAS PAID TO DATE.—A statement of just what Germany has paid to date in reparations and the medium in which the payments have been made is of peculiar interest just now in view of reparations situation. The London *Stock Exchange Gazette*, using official figures, estimates that Germany had paid up to the end of March, 9,511,943,119 marks gold in reparations and restitutions in kind, a sum equivalent to about \$2,800,000,000, at the pre-war rate of exchange. The London authority adds that:

At first sight this sum seems large indeed. However, about three-fourths of the amount mentioned consists of objects of value taken from France and Belgium by the German invaders and returned as restitution to the legitimate owners.

The reparations payments proper come to 1,321,641,102 marks gold, or £66,000,000, according to the following statement:

	Marks
Coal	987,619,017
Cattle	171,816,756
Dyestuffs	49,353,864
Coal by-products	21,552,479
Pictures for Belgium	12,000,000
Drugs	11,558,641
Louvain Library	1,052,200
Various	66,688,145
Total	1,321,641,102

It should be added that the 5,000 locomotives and the 150,000 railway wagons delivered under the Armistice represent 1,100,000,000 marks gold.—*The Literary Digest*, 18 November, 1922.

UNITED STATES

THE LARGEST CRUISING AIRDROME.—When the Disarmament Conference met a year ago in Washington, six battle cruisers, which would have been the largest and fastest of their type afloat, were under construction in various yards, private and governmental, throughout the United States. The keels of all six had been laid and some of them considerably advanced in construction, the degree of completion varying from three per cent to about thirty per cent. The amended designs in accordance with which they were being built, called for a length over all of 874 feet, a beam of about 104 feet, a draft of 31 feet, and a displacement of 43,500 tons. They were to mount eight 50-caliber, 16-inch guns in the main battery and sixteen 6-inch guns in the anti-torpedo battery. The most remarkable feature in these ships was the motive power, which was to employ the electric drive and develop 180,000 horsepower upon four

shafts, and give these ships a speed of $33\frac{1}{4}$ knots. Built as thus designed, they would have been exceedingly handsome vessels, with two cage masts between which there would have been two large elliptical funnels.

It will be remembered that the most sweeping reduction made at the conference occurred among the capital ships—battleships and battle cruisers—which were under construction when the conference convened. Among the ships that were at first eliminated were the six battle cruisers; but, subsequently, among the modifications which were made in the first plans, was one permitting both the United States and Japan each to complete two of their battle cruisers as aircraft carriers. A limitation of a maximum displacement of 35,000 tons was placed on the size of such vessels; a maximum total of 70,000 tons being allowed to any navy for vessels of this type.

Our naval authorities decided to complete as aircraft carriers the two battle cruisers which were most advanced in construction. These were the *Lexington*, building at the yards of the Bethlehem Shipbuilding Corporation, at Fore River, Mass., and the *Saratoga*, which was being built by the New York Shipbuilding Corporation at Camden, N. J., the *Lexington* being at that time 26.7 per cent completed, and the *Saratoga* 29.4 per cent.

Now to those of us who have studied the drawings of these battle cruisers, which were published in the *Scientific American* from time to time, it will be evident that the main hull structure will not be very greatly altered, at least, in its outboard profile. There will be no change in the form of the hull below water, and the changes in the upper structure will be such as are necessitated by the new positions of the 6-inch gun battery, and the provision of the necessary airports, and the openings for the stowage of boats.

The *sine qua non* of an aircraft carrier is the provision of a broad and long flush deck—the longer and the broader the better—extending from stem to stern, and from side to side, with the least possible amount of obstruction. Consequently, in looking at the *Lexington* in its reconstructed form* we see that the four turrets with their eight 16-inch guns have been swept away, together with the whole of the superstructure between them. The two centrally placed masts and the two funnels have also disappeared. In their place we see a single cage mast with abaft of it a huge elliptical funnel, erected on the starboard side of the ship and a little forward of her mid-length. Forward of the military mast is a low conning tower between which and the base of the mast is a chart room. Aft of the smokestack is a deck house for the use of the navigating officers, the officers of the watch, etc. At the forward and after end of these structures is a single derrick for hoisting aircraft from the water. Above the conning tower is a range-finder, and a fore and aft bridge extends from the conning tower around the mast to the after end of the smokestack. A ladder leads from this bridge up to a platform which encircles the smokestack, and carries at each of its corners a high-powered searchlight. The top of the cage mast finishes in an enclosed fire-control platform, and to the rear of this is erected a steel pole mast from which the wireless antennae extend forward and aft, down to suitable connections at the deck. It should be noted that the smokestack serves to enclose five separate uptakes from the boiler rooms.

The after half of the upper deck is used as a flying-on deck for the landing of airplanes, and to assist in bringing them to a standstill after landing at the stern and running forward for some 200 feet, they pass on to a net device, which acts as a powerful brake, and stops them quickly

* See Frontispiece of November issue of the Institute.

but without injury to the machines. Just ahead of the net is a large hatch and there is another one abreast of the conning tower. Through these the airplanes are passed up or down from the flying-deck to the hangar deck below. Just ahead of the forward hatch are two of the new compressed-air catapults, which were designed and developed last year at the League Island Navy Yard. Each of these is carried on a turntable, and they are capable of being trained through a wide arc forward of the beam. They are so constructed that, by the time the airplane leaves the catapult, it has a velocity sufficient for flight. Arranged centrally between the catapults, and extending to the bow of the ship, is an endless chain, or wire rope, by means of which also an airplane may be launched; but the details of this mechanism will not for the present be available for the public. Below the flying-deck is a hangar, which is of sufficient size for the storage of a large fleet of airplanes. On this deck are also various machine shops, where thorough repairs can be made to disabled machines. The vessel is also fully equipped with fuel tanks and the various stores which are necessary to maintain the airplane fleet in first-class fighting condition during an extended cruise at sea. The five large openings abreast of the smokestack are airports opening onto the hangar deck.

The battery of sixteen 6-inch guns is disposed as follows: Forward on each side of the hangar deck are two casemates carrying four guns on twin mounts, and aft on the deck below are mounted four on each side, eight 6-inch guns, which are on twin mounts. On the deck below these are triple torpedo tubes of the standard type used on our destroyers. It should be noted that the flying-deck is cut in for two-thirds of its length to allow for the mounting of twelve anti-aircraft guns. In reducing the displacement of these ships to 35,000 tons heavy reductions had to be made both in the structure and motive power. A great part of this was achieved by removal of the heavy 16-inch gun battery and its turrets, and the heavy protective external and internal armor. Another great reduction was achieved in reducing the horsepower from 180,000 to 33,000, this being made possible both by the lighter displacement and by the reduction of the speed from $33\frac{1}{4}$ knots to 22 knots, which will be sufficient for the *Lexington* and the *Saratoga* to cruise with the fleet.—*Scientific American*, December, 1922.

STATESMEN TO WITNESS FLEET EXERCISES.—Facilities will be afforded by the Navy Department for the members of the naval committees of the Senate and the House and the appropriations committees to witness the joint fleet maneuvers off Panama in the early spring. These exercises promise to be more than usually interesting, especially that portion of the program in which the former *Iowa* will be utilized as a moving target while being controlled by radio without a soul on board. The present plan is for the Navy transport *Henderson* to convey the congressional party to isthmian waters, sailing early in March. That transport will make one voyage to the Pacific meanwhile, but will be back in ample time to prepare for the special trip to Panama.—*Army and Navy Register*, 18 November, 1922.

THE NAVY UNIFIED.—Washington, December 8.—Consolidation of the Atlantic and Pacific fleets, into the "United States Fleet" with Admiral H. P. Jones in supreme command, and Vice Admiral E. W. Eberle as commander-in-chief of the "battle fleet" unit, is announced by the Navy Department. The reorganization, the Department said, involved no change in any present assignment of ships or Navy personnel, but was

chiefly for the purpose of affecting a peace-time organization that could be carried into a war emergency without change.

Under the new plan, the United States Fleet will consist of the battle fleet, composing the main fighting strength of the Navy prepared to engage an enemy fleet; the scouting fleet, the duty of which would be to locate the enemy preparatory to engagement of the battle fleet; the control force, organized to exercise control of the sea and the fleet base force, intended to support the operations of the fighting forces.

The whole organization for purposes of administration in peace or war would be under command of a single officer with the rank of admiral, no matter how far scattered its elements might be.

Admiral Jones now commanding the Atlantic Fleet, is the first to command the United States Fleet, while Admiral Eberle, now commanding the Pacific fleet, takes the rank of vice admiral and command of the battle fleet.

The battle fleet will be composed of battleship divisions under a vice admiral, light cruiser divisions, destroyer squadrons, aircraft squadrons and such submarine divisions as may be assigned. The scouting fleet will be under command of Vice Admiral J. D. McDonald, and will be composed of battleship divisions, light cruiser divisions, destroyer squadrons, aircraft squadrons, submarine divisions and train. The control force will be under command of a rear admiral to be assigned as the relief of Rear Admiral McCully, just ordered as president of the board of inspection and survey, and will be composed of cruiser divisions, destroyer squadrons and mine squadrons.

The fleet base force will be under the command of Rear Admiral J. V. Chase, and will be composed of mine squadrons, aircraft squadrons and train.—*Boston Evening Transcript*, 8 December, 1922.

NAVAL PETROLEUM RESERVES.—The Secretary of the Navy announced December 14, that in pursuance of the Departmental policy concerning the Naval Petroleum Reserves, an arrangement has been made extending the contract heretofore concluded between the Government and the Pan-American Petroleum and Transport Company. Under this supplementary contract the drilling of offset gas wells in those portions of the Naval Reserve No. 1 that are now being drained is to be proceeded with immediately. This is in accordance with the principles of the original contract that granted to this Company preferential rights to further leases in Naval Reserve No. 1. The Government had also obtained the right to require the company to drill additional wells as offsets to any on adjoining private lands when ever such may be required in the future. The original contract with the Pan-American Company provides for the construction and filling with fuel oil of storage at Pearl Harbor. The supplemental agreement requires the completion of the project at this point for converting such additional available royalty oils as may be accruing into other storages at such points as may be designated by the Secretary of the Navy.

The West side of Naval Reserve No. 1 is retained as an underground oil reserve in which no wells can be drilled at any time except by specific authority of the Navy Department. Provision is made, however, for drilling even in this restricted area whenever necessary to protect the Government land from drainage.—J. B. H.

BUDGET ALLOCATION OF THE DOLLAR.—Washington.—The estimate of appropriations needed for the fiscal year beginning July 1, 1923, and ending June 30, 1924, as submitted by the Budget Bureau, completely de-

molishes that standard piece of fiction which has been in service many years, to the effect that ninety cents out of every dollar expended by this government is expended for war purposes. The Budget Bureau analyzes the estimated expenditures, showing how the average dollar appropriated will be divided. The division will be as follows:

For support of the legislative branch of the government, 4 cents; for the Veterans Bureau, 14.5 cents; for other commissions, boards and bureaus outside the regular departments, 1 cent; Department of Agriculture, 4.9 cents; Department of Commerce, .6 cents; Department of the Interior, 10 cents; Department of Justice, including United States Supreme Court and other federal judiciary, .6 cents; Department of Labor, .2 cents; Navy department, 10.1 cents; State department, .5 cent; Treasury department, including appropriations for payment of interest on public debt and reduction of principal, 46.5 cents; War department, including administration of Panama Canal, river and harbor improvements and other non-military activities, 9.9 cents; District of Columbia, .8 cents. The Postoffice department is largely supported from postal revenue.

This clearly shows that the United States is far from being a militaristic nation. In fact, in another chart furnished by the Budget Bureau it is demonstrated that out of every dollar expended, only 13.5 cents goes to purely military and naval purposes in the interest of national defense. The total expenditures charged as "military functions" are 32.7 cents out of every dollar. This includes the 13.5 cents above mentioned for strictly defense purposes and 19.2 cents for pensions, retirement pay, Veterans Bureau, etc.—*National Republican*.

A DEFINITE NAVAL POLICY.—The statement of general policy contained in the Annual Report of the Secretary of the Navy was drawn up by the Navy General Board, and was said by the Secretary to be in his opinion not only sound in the present circumstances but useful "for all times and under all conditions." The major premise of the policy was this:

"The Navy of the United States should be maintained in sufficient strength to support its policies and its commerce, and to guard its continental and overseas possessions."

As a corollary to this basic principle and in view of the Naval Limitation Treaty terms, the General Board further adopted this statement of purpose:

"To create, maintain, and operate a Navy second to none and in conformity with the ratios for capital ships, established by the treaty for limitation of naval armaments.

"To make the capital ship ratios the basis of building effort in all classes of fighting ships.

"To direct the principal air effort on that part of the air service that is to operate from ships of the fleet.

"To assemble the active fleet at least once a year for a period of not less than three months.

"To maintain an active personnel afloat in conformity with the ratios for capital ships established by the treaty for the limitation of naval armament.

"To maintain the Marine Corps personnel at a strength sufficient for current requirements.

"To make every effort, both ashore and afloat, at home and abroad, to assist the development of American interests, and especially the American merchant marine.

"To create, organize, and train a naval reserve force sufficient to provide the supplementary personnel necessary to mobilize the fleet and all its auxiliaries.

"To make the naval reserve secure in its status and organization as a part of the Navy and to guard its interests.

"To cultivate a close association of officers of the active Navy and of the naval reserve.

"To give to the public all information not incompatible with military secrecy.

"To have always in mind that a system of outlying naval and commercial bases suitably distributed, developed, and defended is one of the most important elements of national strength."

The secretary, commenting on this declaration in connection with his discussion of the results of the Armaments Conference, said that the Navy Department had been "entirely in sympathy" with the purposes of the conference, and predicted that the benefits of eliminating competitive navy construction will be realized more and more fully as the years go by.

"For the first time in the history of our country," he said, "the Navy and Congress have a definite naval policy and building and maintenance standard to work to, a standard which is proportionate to our position as a world power. The maintenance of this standard in all respects is necessary to our defense and to our prestige. . . .

"In the past, owing to the lack of a definite naval policy, and to the more pressing need for building up our naval strength in capital ships, it has been impossible to maintain a well-rounded navy. I feel it my duty to report to you that in certain types such as fast cruisers, aircraft carriers, seagoing submarines and aircraft, the Navy is deficient.

"It is not my intention this year, having in mind the financial condition of the country, to make any recommendations for an increase in the Navy, but I recommend that, as soon as conditions warrant, Congress be asked for such an increase as will tend to balance our fleet and make and keep it the equal of any in the world."—*Boston Evening Transcript*, 4 December, 1922.

NEW CONSCRIPTION LEGISLATION.—Of great importance is the project for having on the statute books authority for the President to place the population of the country on a state of availability for industrial, as well as military, service in time of war. Such legislation is sadly needed in order that the citizenship of the nation may become useful in every direction required for the maintenance of the defensive forces and the support of the people at home. It was one of the disastrous consequences of imperfect, or at least incomplete, legislation that the industries of the United States were not under greater control by the Government during the World War and that the workers in the plants and in the field were not as much of the conscripted forces as the members of the military-naval personnel. It would have completely regulated the enormous resources of the country; it would have checked the soaring prices of commodities; it would have stabilized and restricted the wages of those engaged in pursuits at home; it would have enabled the owners and managers of the industries and, especially, the railroads to have conducted those activities without the necessity of turning them over to incompetent and well-nigh ruinous governmental management. There is no reason why every person engaged in any sort of labor, whether productive of war material or supplies for common consumption, should not be drafted into a huge industrial force, with pay corresponding to the compensation of the fighting man or the man in training for fighting. One of the glaring inconsistencies of the war period was the enormous difference in the wages of the man who stayed at home in security and followed his trade and the pay of the man who was drafted for the military-naval service. It is a matter for which provision should be made in advance of war, in such

general terms that will make the system immediately applicable and accessible, leaving it to Congress to fill in the details in accordance with the circumstances of the situation and the demands of the period. The Government need not and should not be permitted to "take over" industries in the sense that it will relieve the experts of their function of management or to the extent that made an unholy spectacle of the so-called governmental administration of the railroads. Every plant should be permitted to operate under its own management, but there should be a limitation placed on wages and on the profits of the owners, to the end that there shall be no such thing as profiteering either by the employé or the employer; no such thing as fattening Government contracts, the basis of which should be the actual cost for labor and material as determined by reduced costs of those factors. It should be possible to apply this system of compensation to the employer and the owner in order that individual income shall be reduced to the minimum. On this basis the cost of living would be held in restraint. The population of the country would, in other words, be entirely separated from gain for the sake of gain. "Prosperity," as represented by private accumulation of capital, would disappear or be suspended for the period of the war. Everyone would be on the same footing, and, at the end of the war, no advantages would be possessed by one class to the detriment of another. A step in the right direction is proposed in new legislation that will be introduced with the intention of having it gain the confidence of Congress and the people, with the plan that, if nothing is accomplished at the present short session, it will furnish the subject of discussion in the new Congress which comes into existence next March. Following is the form of such preliminary action:

1. That, in the event of a national emergency declared by Congress to exist, which in the judgment of the President demands the immediate increase of the military establishment, the President be, and he hereby is, authorized to draft into the service of the United States such members of the unorganized militia as he may deem necessary: Provided, That all persons drafted into service between the ages of twenty-one and thirty years, or such other limits as the President may fix, shall be drafted without exemption on account of industrial occupation.

2. That in case of war, or when the President shall judge the same to be imminent, he is authorized and it shall be his duty when, in his opinion, such emergency requires it—

a. To determine and proclaim the material resources, industrial organizations, and services over which Government control is necessary to the successful termination of such emergency, and such control shall be exercised by him through agencies then existing or which he may create for such purposes;

b. To take such steps as may be necessary to stabilize prices of services and of all commodities declared to be essential, whether such services and commodities are required by the Government or by the civilian population.

—*Army and Navy Register*, 25 November, 1922.

BRAZIL

STRENGTH OF BRAZIL'S NAVY.—The Brazilian Navy's strength is 13,000 men. Of ships it has two battleships of the dreadnaught type, three scout cruisers, six destroyers and three submarines, also some coast defense vessels of old type.

Those who are conversant with the naval armaments of the Latin American countries consider that Brazil's navy is probably second to that of Argentina which also has the same number of battleships of the dreadnaught type as Brazil, but is slightly stronger in the auxiliary types.

Brazil has no navy yards at the present time, and even had she assented to the proposals laid down by the disarmament conference she would not have been in position to over-supply her naval needs. Through her representative at the League of Nations, Brazil objected to a plan submitted recently to the disarmament commission of the League whereby the military establishments of all nations would be reduced. It is said that Brazil's military expenses at present are about forty-five per cent less than they were in 1913.

When Secretary of State Hughes and Brazilian Ambassador Augusto Cochrane de Alencar signed the agreement providing for the special naval mission, on November 6 last, Secretary Hughes explained the objects as follows:

"The purpose of the mission is one of helpfulness to Brazil, to assist the Brazilian Navy Department in all matters that pertain to improvement in their naval service. In this task the mission will collaborate and work in conjunction with the officers of the Brazilian Navy."—*Boston Evening Transcript*, 8 December, 1922.

JAPAN

BUILDING PROGRAM.—London, November 7.—In the latest number of the *Marine Rundschau*, a review of current naval progress issued monthly by the German Navy Department and therefore based upon authoritative information, there is a careful analysis of that part of the Japanese building program which has not been affected by the limitation treaty. It is pointed out that, although Japan claims to have dropped thirty-eight vessels, including one cruiser, from her original auxiliary program, the actual saving in displacement amounts to no more than 14,000 tons, which proves conclusively that all the surviving vessels must have been redesigned with much larger dimensions.

At the end of the World War, continues the *Rundschau*, Japan had only three modern light cruisers—*Yahagi*, *Hirado* and *Chikuma*, which were ships of 5,000 tons, launched in 1911, and mounting eight 6-inch guns apiece. These, however, were not counted, either in the building program of 1920-28 nor in the amended post-conference scheme of 1922-27, although they are still effective ships.

According to the first program the establishment of 1928 was to include twenty-six light cruisers of the first line; in the revised program the number is reduced to twenty-five. Of these the following are already completed: Two ships of the *Tenryu* class and six ships of the *Kuma* class. Three further ships of the *Kuma* class have been launched and all five ships of the following (*Kinu*) class are under construction, though only the *Kinu* herself has been launched up to now.

Four ships of a still later class (*Kako*) have also been put in hand, but there is no definite information concerning the remaining cruisers beyond the recent message from Tokio that the *Kinugusa* and *Furutori* were to be laid down shortly. The reports of their dimensions are conflicting; some messages credit them with 10,000 tons, others with only 7,000 tons, but the *Rundschau* thinks the first figure is probably nearest the mark. Finally the name of a new cruiser, the *Yubari*, has lately been heard, but it is not known to which class she belongs. (This ship has since been identified as one of the new 7,500-ton class.)

The *Rundschau* prints a table, reproduced on page 338, to show the present state of development of the Japanese cruiser fleet.

Commenting on this table, the *Rundschau* says it is possible that cruisers Nos. 18 to 21 displace 10,000 tons, and those numbered as 22 to 25 may be ships of only 7,000 tons. The extraordinary number of cruisers now build-

ing in Japan is explained by the fact that the authorities, being anxious to avoid the wholesale discharge of workmen that would have been necessary had no contracts been substituted for those canceled by the limitation treaty, decided to put in hand the bulk of the auxiliary program without delay in order to give employment to the shipyard workers.

The original destroyer program has been curtailed, thirteen boats of the second-class being dropped. On the other hand, all the first-class boats authorized previous to the conference are to be proceeded with, and twenty-four of them are now building or on order, each with the big displacement of 1,500 tons. Their completion will bring the Japanese flotilla of first-class boats up to forty-six, and there will also be forty-one modern second-class boats of 850 tons. Referring to the Japanese submarine program, the *Rundschau* says that it was first intended to have ready by the year 1928 a fleet of ninety-three big underwater boats, besides seventeen smaller submarines suitable for coast-defense operations.

Under the modified post-conference scheme, twenty-four of the new submarines have been canceled, bringing the total of ocean-going boats down to sixty-nine. (These, however, are to be of considerably larger dimensions than had originally been planned.) Finally, the *Rundschau* learns that four airplane carriers are completing—the *Hosho* and *Shokaku*, each of 9,800 tons and high speed, with unobstructed decks and accommodation for twenty to thirty airplanes apiece, and the converted battle cruisers *Amagi* and *Akagi*, each of which is to carry fifty airplanes.

The foregoing data, compiled by the German Navy Department from its official sources of information, coincide very closely with the details which have been received here direct from Japan, but the latest intelligence at hand shows the amount of submarine construction actually in progress or on order to be understated. At least ten boats should be added to the sixty-nine, bringing the total of heavy long-range submarines up to seventy-nine, and even this figure is believed to be short of the real number.

Furthermore, the displacement of several ships in the cruiser table is larger than that shown, the *Abukuma*, *Ayase*, *Minase* and *Otomase* being vessels of 6,500 tons or thereabouts, and the *Yubari* of 7,500 tons, and their armament is, therefore, probably more powerful than the table suggests. On the other hand, I understand that the airplane carrier *Shokaku* has been canceled, or indefinitely postponed, so that the number of these ships actually building is reduced to three.

None of the totals of present Japanese naval construction takes into account the auxiliary vessels, properly so called, of which large numbers are being built. These include mine-layers, ammunition ships, colliers, oil tankers and so forth, all of which are equipped with defensive armament. The one outstanding feature of the situation is that Japan today is building a far larger aggregate of naval tonnage than any other power—in fact, it would probably be no exaggeration to affirm that she is building as much if not more of this tonnage than all the other powers put together.

Present state of development of the Japanese cruiser fleet, as reported by the German *Marine Rundschau*:

No.	Name	Date of		Displacement in Tons	Armament
		Launch	Completion		
1.	<i>Tenryu</i>	1918	1919	3,500	4 5.5-in. guns 6 Torpedo tubes
2.	<i>Tatsuta</i>	1918	1919	3,500	
3.	<i>Kuma</i>	1919	1920	5,600	7 5.5-in. guns 8 Torpedo tubes
4.	<i>Tama</i>	1920	1921	5,600	
5.	<i>Kitakami</i>	1920	1921	5,600	
6.	<i>Kiso</i>	1920	1921	5,600	
7.	<i>Oh-i</i>	1920	1921	5,600	
8.	<i>Nagara</i>	1921	1921	5,600	
9.	<i>Isudzu</i>	1921	1922	5,600	
10.	<i>Natori</i>	1922	5,600	Guns unknown probably 6-in.
11.	<i>Yura</i>	1922	....	5,600
12.	<i>Kinu</i>	Bldg.	....	5,600
13.	<i>Ayase</i>	Bldg.	....	5,600
14.	<i>Otonase</i>	Bldg.	....	5,600
15.	<i>Minase</i>	Bldg.	....	5,600
16.	<i>Abukuma</i>	Bldg.	....	5,600
17.	<i>Yubari</i>	Bldg.	5,600	Battery of 8-inch guns.
18.	<i>Kako</i>	Bldg.	....	7,000
19.	<i>Naka</i>	Bldg.	....	7,000
20.	<i>Sendai</i>	Bldg.	....	7,000
21.	<i>Jintsu</i>	Bldg.	....	7,000
22.	<i>Kinugasa</i>	Bldg.	....	10,000
23.	<i>Furutori</i>	Bldg.	....	10,000
24.	Unnamed.....	Bldg.	10,000	
25.	Unnamed.....	Bldg.	....	10,000

—Hector C. Bywater in *Baltimore Sun*, 3 December, 1922.

COMPETITION IN MERCHANT MARINE.—Seattle, Wash., November 30.—Contrary to the latest reports that the Shipping Board's merchant marine is financially unsuccessful, the big liners operated across the North Pacific to the Orient are rapidly putting the allied Japanese lines out of business.

The Shipping Board's ships are carrying capacity cargoes and heavy passenger lists.

The largest shipment of raw silk to be brought from Japan in one ship arrived here recently on the *President Grant*, valued at \$8,000,000. In all, the cargo valuation was more than \$12,000,000. Bound to the Far East, they carry immense loads of lumber, wheat, flour, manufactured goods, cotton, tobacco and canned goods.

The Japanese liners, though subsidized by the Imperial Government, are face to face with a formidable competitor for the first time in the history of North Pacific shipping.—*Baltimore Evening Sun*, 30 November, 1922.

MERCHANT MARINE

HOUSE CHANGES IN SUBSIDY BILL.—After having been further amended, the ship subsidy bill was passed by the House on November 29 by a vote of 208 to 184. Only four Democrats supported the bill while 69 Republicans voted against it.

The most important modification was that adopted at the suggestion of Representative Madden of Illinois forbidding any expenditure to be made from the Merchant Marine Fund except out of appropriations voted annually by Congress.

Another change affecting the industrial ships was offered by Mr. Edmonds to meet the strong opposition that came from both sides against the Government paying several million dollars annually to industrial companies owning ships used for the exclusive transportation of their own commodities. The amendment, however, did not exclude them from the benefits of the direct aid, it being provided that the industrial ships might receive subsidy for that portion of their revenues attributable to cargoes carried for other interests.

The House accepted without much discussion the amendment offered by Representative White of Maine making it possible for sailing ships, as small as 500 tons, instead of 1,000 tons, to receive subsidies.

The provision allowing shippers a rebate from their income taxes equal to five per cent of the amount paid American vessels for the carriage of freight was eliminated. Advocates of the bill consented to its being stricken out because they believe that it was unconstitutional and would not stand in the courts.

The interest rate on the \$125,000,000 Construction Loan Fund was increased from two to four and a quarter per cent. As this is a much lower rate than foreign shipowners are obliged to pay for shipbuilding funds, this change is satisfactory to the friends of the bill.

An amendment approved by the Post Office and the shipowners provides that the Post Office shall pay steamship lines for all mails carried instead of turning over approximately four million dollars a year to the general subsidy fund and requiring the mails to be handled free. This change will increase the revenue of the fast passenger and mail liners and serve as a recompense for the losses caused by our prohibition legislation.

The provision permitting the Shipping Board to sell vessels at private competitive sales without advertisement was struck out of the bill. The other amendments were of minor importance and were adopted either to safeguard the public interest or to clarify the language of the bill.—*The Nautical Gazette*, 9 December, 1922.

SENATE CHANGES IN SUBSIDY BILL.—Instead of accepting the ship subsidy bill in the form passed by the House, the Senate Commerce Committee has changed the measure in several particulars. The most important amendment was the striking out of the Madden provision requiring Congress to pass annual appropriations for any sums to be paid out of the Merchant Marine Fund as subsidies to shipowners. In a letter to Senator Jones, President Harding had objected to this clause on the ground that it would interfere with the organization and financing of new and smaller shipping concerns as well as with the purchase by private parties of the Government's tonnage which is one of the main objects sought to be obtained by the pending bill. While eliminating the Madden amendment, the Senate Committee added a new clause proposed by Senator Willis of Ohio making it impossible for the Shipping Board to augment any individual shipping concern's basic rate of compensation unless Congress should consent thereto and appropriate annually the additional sum required to make such increase effective. It remains to be seen whether Congress will approve this compromise.

The Senate Committee also eliminated the amount of compensation payable in any one year to \$30,000,000, or sufficient to subsidize 7,500,000 tons of privately owned and operated shipping. This maximum sum is only three-fifths of the estimated annual yield of the tonnage dues and of the

proportion of all import duties collected set aside for the Merchant Marine Fund under the terms of the bill. The question has been raised what would become of the remaining and unexpended balance of the fund which it is intended to segregate permanently from the other moneys in the Federal Treasury. It is to be regretted that the Committee struck out the clause allowing vessel owners to deduct from their taxable incomes any sums earned by their ships in the foreign trade and set apart for new vessel construction. Even though no substantial results are to be anticipated from this clause during the present shipping depression it may prove of value hereafter when normal conditions again prevail. An advisable change seeing that it would prevent the Shipping Board from turning down an individual in secret was the insertion of a provision providing that no application for a subsidy contract could be refused until after a public hearing.

This exhausts the list of important modifications made to the House bill by the Senate Committee. The amendments that have been made have not allayed the opposition to the bill and its passage by the Senate is doubtful. Proponents of the pending Merchant Marine Act continue to claim higher operating costs are responsible for the laying up of a large part of our merchant tonnage when the real cause is a lack of cargo. Even the Shipping Board admits this, for in its just issued annual report it states that during the first half of the fiscal year 1921-22 its "tankers were fairly well employed in all trades which showed a profit on the round trip." Later on a material change occurred in the demand for oil and it became necessary to tie up more of its oil carriers each month because of a reduced demand for tankers. The same conditions confronted private owners of American tank tonnage, a situation which payments from the national treasury would not have remedied. Again, in explaining the deficit of \$587,332.45 incurred by his company in the fiscal year ending June 30, 1922, Vice-president Drake of the Panama Railroad Steamship Line states that the primary cause of this loss was the world-wide depression in business with its consequent heavy decrease in tonnage transported. The real cure for the depression our shipping is suffering from is more business and not Government doles.—*The Nautical Gazette*, 16 December, 1922.

AMERICAN AND FOREIGN SEAMEN.—In rapidly increasing numbers native American seamen are deserting the ships of our mercantile fleet and leaving them to be manned by polyglot crews of foreigners. On December 1, 1920, about fifty per cent of the crews on merchant vessels under the Stars and Stripes were native born Americans, but from that time the proportion has steadily decreased until today it is as low as fifteen per cent. In the same period the ratio of naturalized Americans dropped from twenty per cent to less than five per cent. If this condition continues it will not be long before an American seaman will be come a *rara avis*.—*The Nautical Gazette*, 9 December, 1922.

ITALY'S MERCHANT FLEET.—As compared with 644 ocean-steamers of 1,534,738 gross tons on December 31, 1914, Italy possessed 868 steamers of 2,539,833 tons on July 1, 1922, says E. T. Chamberlain, of the Transportation Division of the Department of Commerce in *Commerce Reports*.

When Italy entered the war sixty-nine steamers of the Central Powers aggregating 251,000 gross tons were seized in Italian ports and employed thereafter in her fleets, but of these forty-two were lost or allotted to other powers. The treaty of St. Germain provided that Austria and Hungary should surrender all their property in merchant ships and fishing boats without regard to size, and from this source, under awards of the Reparations Commission, Italy up to the end of June, 1922, had received 213

steamers of 578,000 gross tons. From a shipping point of view Italy came out of the war, judged by present tonnage figures, in better condition than any other European power except Belgium.—*The Nautical Gazette*, 16 December, 1922.

"MAJESTIC'S" NEW OCEAN RECORD.—On her last eastward voyage the White Star liner *Majestic*, just out of dry dock and equipped with new propellers, made a record passage between New York and Cherbourg. Her average speed was 24.59 knots an hour. The *Majestic* left Ambrose Channel lightship at 12.57 P. M. on November 25, and passed the buoy off Cherbourg breakwater at 12.10 midnight on December 1. The total distance covered was 3,100 miles. The previous best run to Cherbourg from this port was five days eight hours and nine minutes, made by the Cunarder *Mauretania*, which covered the long summer course of 3,201 miles at 25.33 knots or a higher hourly average than the *Majestic's*.—*The Nautical Gazette*, 9 December, 1922.

ENGINEERING

THE PROPULSION OF SUBMARINES.—To many people, no doubt, the news that a fatal explosion had occurred on board submarine *K-26* at Chatham Dockyard on November 3 was the first intimation that a steam-driven submarine vessel is being constructed for the Royal Navy. The boat in question belongs to the famous *K* class, and is one of a number of vessels of war which had been laid down prior to the Armistice, and whose completion was decided upon for special reasons. The *K-26* was begun by Vickers in July, 1918, launched in August of the following year, and towed to Chatham for completion. At the time of the accident she was being prepared for trial. According to the evidence given at the inquest on November 6, the safety valves were being tested, when a large escape of steam took place, filling the machinery compartments with dense clouds of steam, smoke and soot. Two men in the boiler room were so badly scalded that both succumbed to their injuries. An inspector of fitters, giving evidence, explained that the steam from the boilers, which had reached a pressure of over 200 lb., rebounded against the bottom of the waste steam pipe, and was forced through the furnace into the boiler room. The waste steam pipe was of a special design, necessitated through lack of space on board submarines, but the shape of that pipe was to be modified. Such an accident, he added, was impossible in any other type of ship. The authorities were satisfied that the valves were in working order. Fortunately, the oil sprays were not burning at the time. Engineer-Commander Mitchell, another witness, explained that before a submarine of the *K* type dived while at sea, the order, "Prepare to dive," indicated to the men in the boiler room that they must leave it at once to avoid an accident, similar in some respects to the present one. Before submersion took place the doors covering the funnels were closed.

The *K* class submarines have no parallel, either among British submarines or among the underwater boats of the world. They were designed for the special purpose of accompanying the battle fleet on its war cruises and acting in tactical co-operation with it. For that purpose it was necessary to endow them with good sea-keeping qualities and high speed, and the latter requirement involved the use of steam engines in place of the internal combustion motor usually fitted in submarine vessels. Since the war this class has been exposed to a good deal of criticism, but the fact remains that within the limited scope of duties they were intended to fulfil the boats were reasonably successful. Their actual value in the fighting line was never tested, as no major fleet engagement was fought after they came

into service. The peculiar features of the design were ventilated in the press nearly two years, when *K-5* foundered with all hands in the Western Approaches while exercising with the fleet. On that occasion Rear Admiral S. S. Hall—who had been Commodore of Submarines during the war and could therefore speak with high authority—described the class as “freak” submarines, and affirmed that they had always been a source of great anxiety in bad weather or in rapid diving. That was because of their great length and the structural complications due to the employment of steam, which necessitated large openings for funnels and air intakes to the boiler rooms. Thorough training on the part of the *personnel* is essential to the safe handling of these boats. They have no fewer than five kinds of motive power for propulsion on and under water and for operating the complicated system of machinery with which they are fitted. To attain the designed surface speed of 24 knots, two sets of single reduction turbines are installed, taking steam from two small-tube boilers with forced draught. When the boat is required to dive quickly or to get under way promptly after breaking surface, an 800 brake horsepower Diesel motor is called into play, and for navigation under water electro-motors are employed. Other machinery includes electric motors for lowering the funnels and closing water-tight hatches over the funnel openings; air compressors for charging air bottles and blowing ballast tanks; and hydraulic power for working the hydroplanes and raising the periscopes and telescopic masts. It is no wonder therefore that every *K* boat is known in the Navy as “a box of tricks.” When commenting on the loss of *K-5*, Admiral Hall expressed surprise that any of the class had been kept in commission after the war. It was presumably done with the intention of perfecting their maneuvers with the battle fleet, “but,” he added, “it appears to be a very questionable policy, since the class will be obsolete long before a fleet battle can take place. They were designed solely for the North Sea, and have not the qualifications nor the sea endurance to accompany a battle fleet under war conditions, except in home waters.” The Admiralty, however, must have had good reasons for deciding to complete the *K-26*, although five sister boats unfinished at the Armistice were cancelled. That steam will ever be reverted to as the motive power of future British submarines is not very probable. For this type of vessel it has inherent drawbacks. So far as the British Navy is concerned, it was first tried in the *Swordfish*, a pre-war submarine which proved a failure, and it would certainly not have been re-introduced in the *K* class, but that the attainment of the very high speed aimed at was impracticable with Diesel engines. Our fastest boats—and indeed the swiftest submarines of any navy during the war—were those of the *J* class, fitted with three engines, each having twelve cylinders and developing a total of 3,600 brake horsepower. In France, however, steam propulsion for submarines has been in vogue many years, and although the system is apparently being abandoned, several of the largest boats of her present-day navy are steam-driven. They are the *Dupuy de Lôme*, the *Sané* and the *Gustave Zédé*, with a surface displacement of approximately 850 tons. We understand that the French naval authorities are considering a project of replacing the steam machinery of these three submarines with Diesel engines taken from surrendered German boats. Should this decision be reached, it will not be easy to reconcile with the reports, lately published in France, of the remarkable success which has attended the performance of the Schneider-Carels Diesel motors installed in the large submarines, *Néréide*, *Fulton*, and *Joessel*, two of which are said to have exceeded their designed speed of 16½ knots by 1½ knots. Commenting recently on the development of the French submarine flotilla, the *Paris Temps* stated that the problem of manufacturing an entirely satisfactory motor for submarine use had at length been

solved, and "we now possess a motor, entirely French in type, which is in no way inferior to the Diesel engines that made the fortune of the German fleet." The Commandant of Toulon naval station is quoted as having reported that the *Néréide*, *Fulton* and *Joessel*, equipped with the new French motor, leave nothing to be desired. In these circumstances, it is not clear why the motors of ex-German submarines should be used to re-engine the French steam-driven boats which it is proposed to convert to Diesel drive.

When the war broke out, we in this country were admittedly behind Germany in the production of high-power Diesel motors suitable for submarines, and so long as the struggle continued there was no opportunity to develop an engine capable of giving an output of power per cylinder equal to that of the German type. Germany's largest submarine engine developed 300 brake horsepower per cylinder, and the ordinary *U* boat engine 200 brake horsepower. As Mr. A. W. Johns has pointed out in a paper on German submarines, the necessity for quick production of engines in this country during the war prevented progress beyond the standard 100 brake horsepower per cylinder though the obvious advantages, from the point of view of hull design, conferred by the reduced length of the larger cylinder engine for the same total power were clearly recognized by our designers. Since the war the Admiralty has been devoting much attention to the improvement of submarine motors, and notable progress is believed to have been made, though hampered of late by the reduced funds available for research and experimental work on behalf of the Navy. The features of the *X-1*, a submarine laid down at Chatham twelve months ago, have yet to be disclosed, but it is a safe presumption that she will be propelled by Diesel engines. Meanwhile, the impending trials of the *K-26*, the last of our steam-driven boats, will be watched with interest, though it would appear from the account of the explosion at Chatham that she is not free from the disabilities which have caused most of the other units of her class to be withdrawn from active service.—*The Engineer*, 17 November, 1922.

STAINLESS STEEL TUBES.—It is of very great interest to note that Messrs. Firth, of Sheffield, have, after a lengthy series of experiments, succeeded in manufacturing stainless steel tubing. So far, we believe the tubes which have been produced do not exceed fifteen feet in length and are about three inches in diameter; but even so, the fact that stainless steel tubing can now be manufactured should be carefully noted by engineers and particularly by makers of condensers and similar appliances. Stainless steel is admittedly expensive, and on the score of its cost its use has been restricted to a greater extent than by any other factor. We would be prepared to find that in the case of stainless steel tubing the influence of cost would be still more restrictive. On this head, however, it seems to be hinted that it has been found possible, not only to produce stainless tubing, but also to produce it in a manner new to tube making in general, involving fewer processes and a greatly reduced manufacturing cost.—*The Engineer*, 1 December, 1922.

ENAMELLED PROPELLERS.—An improvement in the manufacture of ship screw propellers has been made by providing them with an enamel coat, a process which has recently been patented by the Helix Company, of Berlin. Up to now, high-class vessels have been provided with bronze propellers, well machined and polished, which do not corrode; but as bronze is very costly, ordinary freighters and similar craft have generally been fitted with cast-iron or cast-steel propellers. The disadvantages of the latter are that they are soon corroded by the action of sea water

and that their rough surfaces considerably reduce the screw efficiency, so that the speed of the ship is reduced in comparison with that obtained with a bronze propeller. It is claimed that the new Helix enamel coating has the same effect as the adoption of bronze. The enamel is applied to the propeller surface with the propeller red hot and makes the blades of cast-iron and cast-steel screws as smooth as if polished, and there is no subsequent corrosion. Experience with Helix enamel-coated propellers is said to have shown excellent results, especially as concerns efficiency, the speed of vessels having been decidedly improved after the existing propellers had been enamelled. Another advantage of the enamelled propeller is that it can be easily seen in clear water, and thus ropes or other obstructions fouling the propeller can be easily noticed and removed without the aid of a diver. Helix enamel-coated propellers have been largely introduced on German and Dutch river and seagoing vessels.—*The Shipbuilder*, December, 1922.

DIESEL-ELECTRIC SHIP "PELIKAAN."—The *Pelikaan*, an illustration of the engine room of which is shown on the opposite page, is a mothership for submarines for service in the Netherlands East Indies. The vessel was built by the Netherland Shipbuilding Company, Amsterdam, and engineered by the "De Schelde" Shipbuilding & Engineering Company, Flushing.

The principal dimensions of the *Pelikaan* are:

Length, overall.....	307 ft. 2 in.
Breadth	42 ft. 7 in.
Depth	27 ft. 2 in.
Draught	13 ft. 2 in.

As a considerable amount of repair work has to be carried out on the vessel, a well-equipped workshop is installed and also storage sufficient for the running stores required for six submarines. The oxygen store contains a battery of twenty-four cylinders of oxygen, the contents of which can be pumped into the oxygen cylinders on board a vessel lying alongside. This store also contains seventy-eight cylinders of carbonic acid gas. On the upper deck of the vessel is a hangar for two seaplanes which are handled by an electric winch and a derrick attached to the main mast. In this compartment the tanks for petrol and oil for the 'planes and the motor boats are fitted. A battery of cylinders of carbonic acid gas is fitted immediately beneath the hangar to which there is a connection, so that the compartment can be filled with gas in case of fire.

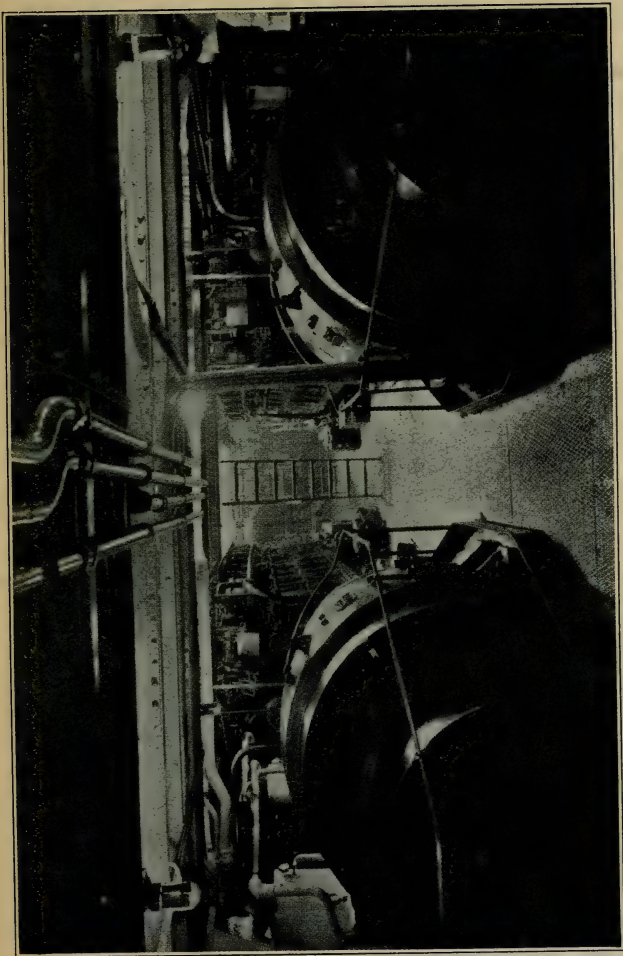
The *Pelikaan* has two complete refrigerating plants which are used for the refrigerated stores and magazine cooling.

The particular form of stem fitted to the vessel has been adopted as it serves for hoisting loads up to forty tons. The deck machinery is electrically driven and includes a winch fitted on the bridge deck at the foremast, a boat winch at the main mast, two windlasses on the upper deck and one on the forecastle. The steering gear is of the electro-hydraulic type controlled by telemotor.

The armament of the vessel consists of four machine guns and four 7.5-cm. anti-aircraft guns. Each mast is fitted with a searchlight.

Machinery

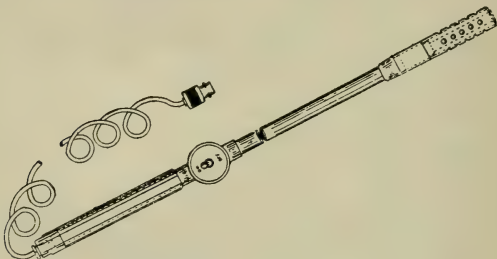
The propelling machinery of the *Pelikaan* is of the Diesel-electric type. The Maschinenfabrik Augsburg-Nurnberg supplied the Diesel engines and the Electrotechnische Industrie, Slikkerveer, the main motors. Each of the two 700 h.p. Diesel engines has six cylinders and drives a continuous-current dynamo of 468 kw. 1,200 amps. 390 volts, which supply current to the main motors, the torpedo air pumps and for charging submarine batteries. The



ENGINE ROOM OF THE "PELIKAAN," SHOWING THE M. A. N. DIESEL ENGINES
AND THE MAIN GENERATORS

continuous current propelling motors are of 570 s.h.p., 380 volts, 1,200 amps. at 190 r.p.m., and each drives a three-bladed propeller. The wiring is so arranged that each dynamo can drive either motor and can also drive both motors simultaneously. The main switchboard is installed in the engine room on the port side. For driving the winches, the steering gear motor, the motors in the repairing shop, the converters and for lighting, two compound continuous-current dynamos of 32 kw. 220 volts and 145 amps. are fitted in the engine room, coupled to a 50 h.p. Diesel generator. On the awning deck a dynamo is installed driven by a 25 h.p. Kromhout motor, as a spare installation for emergency lighting and for driving the boat winch.—*The Marine Engineer and Naval Architect*, December, 1922.

LIGHTING OIL-FUEL BURNERS ELECTRICALLY.—One of the difficulties met with in the operation of oil-fired boilers on board ship is the starting up of the oil-fuel burners. The usual method adopted consists in burning some waste soaked in fuel oil underneath the burner until the temperature has risen sufficiently high to ignite the oil when it is pumped



THE WHITE ELECTRIC IGNITER

through the burner. Sometimes the oily waste gives place to some form of flame torch which has first of all to be set burning before being applied to the burners. Both of these methods suffer from the grave disadvantage that they involve the use of a naked flame in the stokehold. This is obviously accompanied by certain grave risks in view of the fact that the atmosphere in the stokehold may be laden with the highly inflammable vapors which are often given off by fuel oil, and further, there is always the possibility of oil accumulating in containers and savealls, or being spilled on the stokehold flat, and if this should accidentally come in contact with a naked flame the danger of fire is very great.

With a view to minimizing the danger of fire in the boiler room, many attempts have been made to produce a device for igniting oil-fuel burners which shall supersede the use of the naked flame, and one of the simplest and best of these which has so far been brought to our notice is the White Electric Igniter which has just been put upon the market by the White Patent Oil Burning Company Limited, of Newcastle-upon-Tyne. This igniter has been produced by the inventor of the well-known White patent oil-burning system as the result of repeated experiments, and it is claimed that it yields a practical and efficient method for igniting the oil as it issues from the oil-fuel burners. As will be seen from the drawing reproduced herewith, the igniter consists of a handle carrying an ordinary

tumbler switch, while at the other end is a heater element which becomes red hot when current is passed through it. The White electric igniter is adapted for use with the ordinary electric light circuit on shipboard, and is made for voltages of 100 to 120, which renders it suitable for use on the majority of lighting circuits found on board ship, and it is provided with a flexible cab-tyre cable carrying a plug as shown, or an adaptor so that it can be connected up to any lamp holder or to a plug connection, according to what is available. In order to ignite the burner, the heater element of the igniter is inserted in the sight-hole in the furnace door and the current switched on. The element quickly becomes red hot and, on opening the valve on the burner, the spray of oil is immediately ignited. It is stated that only a few seconds are required to bring the element to a red heat.

The igniter is of handy size, measuring only 3 ft. 3 in. in length overall, and it is supplied with two clips for attaching to any convenient point in the boiler room.—*The Marine Engineer and Naval Architect*, December, 1922.

AERONAUTICS

THE MARTIN OBSERVATION AIRPLANE.—A new type of "gun-spotter" for directing the fire of battleships from the air which was designed under Navy specifications by the Glenn L. Martin Company at Cleveland, Ohio, has recently been undergoing a series of tests by a trial board. According to opinions of experts in the Bureau of Aeronautics, Navy Department, the new ship gives every promise of success.

The new plane, known as the Martin Observation or *MOI*, is a three-seater monoplane with an all metal frame construction of aluminum alloy, and is designed for spotting and for short distance reconnaissance work. It is equipped with a 375 h.p. Curtiss *D12* engine.

Airplane spotting as a practical method of fire control has been thoroughly worked out in target practices held by the battleships during the past two years, but the planes used for the purpose were adaptations of



THREE-QUARTER FRONT VIEW OF THE GLENN MARTIN "OBSERVATION" PLANE

existing types and were not altogether suited to the service requirements. The Martin Observation has been specially designed to become an integral part of the fire control organization of the modern battleship and as such will have an important bearing on the accuracy of naval gunnery.

The development of a spotting plane is another step in the way of providing aircraft specially equipped and specially suited to naval requirements. Prior to the war little more was expected or required of planes than that they fly. During the war the tendency was toward the development of bombing and scouting planes to combat the submarine menace, but since the Armistice the needs of the Navy in aviation have

been the subject of careful study which has resulted in a specialized development of types. This was reflected in the *F5L* scouting planes, the recently developed *Douglas* torpedo planes, the *TS* combat planes, and now the *MOI* three-seater spotter.

To suit the varied conditions under which a naval plane must operate, the *MO* is designed for interchangeable landing gear which will make it adaptable for landing and taking off from the deck of an airplane carrier, or in place of wheels for landing and taking off pontoons may be substituted which will permit of landing and taking off from the water. The plane is also designed to be quickly assembled and knocked down for storage in a small space, a feature that will make it particularly suited to conditions on shipboard. The all metal feature of construction insures greater life and durability, and is at the same time a measure of economy in the repair and upkeep of the aircraft squadrons of the Navy. This with its attending advantages is a direct result of investigation and research conducted by the Bureau of Aeronautics.—*Aviation*, 11 December, 1922.

PILOTLESS AEROPLANES.—A fortnight ago we noted a report from America announcing the success of tests made with a wirelessly controlled aeroplane with which the United States Army Air Service has recently been experimenting. Flights of over ninety miles were achieved, and it was claimed that the machine could be guided with great accuracy over any selected point and there caused to discharge its load of bombs. We pointed out that this performance had already been excelled by a French wirelessly controlled aeroplane in 1919, at about the time when the American experiments were being begun, and that the comparative ease with which the enemy might upset the control by "jamming" the wireless rendered the machine of very little value as a weapon of war. News is now at hand from France concerning a new form of pilotless aeroplane. Last Saturday, it seems, a demonstration was given at Etampes, on a Voisin 300 horsepower biplane, of the Percheron-Bernady system of aeroplane control. This system, as demonstrated, involves, it is understood, the use of gyroscopes and subsidiary engines. Ascent and descent and turning of the machine are controlled by the pilot, not by means of the usual wheel or stick, but by merely pressing one or other of a series of buttons. Presently it is intended to dispense with the pilot and effect the operation of the buttons pianola-wise by means of a perforated roll of paper and clock-work. Again the claim is advanced that the arrangement will add a new terror to bombing in warfare. Insofar as the machine is independent of wireless control, it is free from the form of interference by the enemy, to which we have already referred; but unless automatic fighting apparatus can be added to it, it is hard to see how it could escape destruction at the hands of an alert enemy in the daytime, while at night the impossibility of observing it and correcting its course for errors in the estimation of the drift should render its chances of striking a selected target remote in the extreme.—*The Engineer*, 1 December, 1922.

EXTENSIBLE WING EXPERIMENT.—The following news item is taken from *The Times*, London, of October 31, 1922:

M. Maneyrol, the well-known sailplane flier, has made some interesting experiments in Villacoublay over the week-end on an airplane fitted with extensible wings.

One of the most important factors which make for security in flying is the widest possible difference between the extremes of speed by which an airplane is maintained in the air. An ideal machine would be one which, while capable of a speed of 200 or 250 miles an hour, could never-

theless maintain itself in the air at a speed of six to ten miles an hour. One of the means by which this end can be attained is the extension at will of the length of the wing.

Last year the engineers, Lavasseuseur and Gastambibe, constructed an airplane fitted with wings, the extremities of which could be made to disappear at will, and this solution of the problem was successfully tested at Etampes. It is a new machine constructed by Bille on the same principle, but possessing qualities of greater rigidity, which M. Maneyrol has now been testing, with the best results.

The Bille machine, after lying at 170 kilometers (105.6 miles) an hour, reduced its speed to 60 kilometers (37 miles) an hour, and then to 20 kilometers (12.4 miles) an hour, before landing. The extension and reduction of the length of the wings, which were effected at will in full flight, occupied no more than six seconds. The airplane had been handed over to the technical section of the army and will be entered for the Aero Club's safety prize.—J. B. H.

GENERAL RULES FOR AIR COMBAT.—Surprise and Attack Regardless of Consequences: The combating power of the one-seater lies in the attack. In an attack, the surprise and a fearless closing with the opponent as near as possible (less than 100 meters) before the opening of fire, play the chief part. The one-seater makes his surprise attacks, flying out of the sun, toward the enemy, or in the steepest dives.

Proper Shooting Distance

The one-seater is only at the proper shooting distance when he flies into the enemy's propeller whirlwind and constantly has the feeling that he will ram the opponent at once. At such distances the large and close target must be hit by using the gauger and sights even with aiming errors; with the employment of light tracer ammunition the position of the stream of bullets can be frequently improved. The use of the aiming telescope at such short distances is not advisable.

Firing at longer distances with the aiming telescope is solely to be used to shoot at a fleeing opponent—to force him, through short bursts at greater distances, to circle and to then cut him off while circling—or to help in time a far-away harassed comrade.

Attacking Direction

The most effective attacking direction against one-seaters is the one from above to the rear, to the rear and from the rear below. Shooting the opponent from the front is in most cases not possible with the short shot possibility due to the speed of the aeroplanes and the blanketing of the pilot by the engine. An opponent, who shoots while swooping down from a great distance, betrays the beginner or shows shyness to engage in the curve combat at a close distance. Even accidental shots are herewith rare.

Working Together

Fundamentally two one-seaters should always co-operate even in squadron formation. If one of the two attacks a hostile one-seater, his comrade does not take part in the air combat, but remains in readiness for immediate action and covers the rear back of the comrade against a surprise attack by other hostile aeroplanes. Only then is participation in the combat proper, if the opponent threatens to win the upperhand. The attacked aeroplane is, if it does not burn or break up, always closely pursued till its impact or landing. Turning away from the opponent on account of inexperience or in consequence of hostile action, even if only

for seconds, means for the comrade in the vicinity not only the right, but also the duty to take part at once. Herewith the fundamental rule remains, never to impede the curve combat of a comrade by a desire to open fire.

The Opening of the Combat

With a prompt recognition of the hostile aeroplane turn at once against it, shoot and then try in curve combat to get in the rear or underneath him (if opponent has a rotating motor turn to the right if possible).

When in doubt as to whether it is a hostile or friendly aeroplane, turn against it at once, push underneath the suspicious machine at full speed and only, if the coward is recognized or opponent shoots, to pull high and return the fire. With a surprise attack from the rear, if there is no time to turn around, tip up steeply at once with full gas, once again pull up high and go into the curve or immediately with the most powerful ruderpush take the steepest curve.

Curve Combat

In curve combat the curve must not be changed or downward steering be given, if the opponent ascends above. Herewith there is still the possibility of shooting the opponent from below, as it is not at all advisable, to go above an aeroplane, which can shoot upwards. The curve combat itself is always led with full gas. If the one-seater perceives, that in spite of his efforts the enemy will come behind him because of greater turning ability of his aeroplane or flying superiority, then quickly overdraw the machine in the curve, whereupon it stands at once on its head, turns three to four times quick as lightening round its own axis, and catches itself again on its own accord after a sudden fall of 100 meters at the most. The pursuer is in this way always shaken off for some time.

Rear Cover

The one-seater operating alone over hostile territory is easy to combat, when fearlessly attacked, as he lacks the rear cover on the one hand, and on the other hand must strive again to reach his lines. Therefore, with attacks on captive balloons and in squadron combats beyond the front, constant teamwork is absolutely necessary. This supplies the necessary defense for the rear attack. Frequent practice is, however, necessary.

Combat of the One-Seater against Hostile Double-Seaters

Herewith too, the surprise plays the chief part on our side and on the other side of the lines, besides making possible a quick rush across the danger zone of the enemy's movable machine gun. Suddenly push down in the steepest drop without shooting, place oneself at once behind or underneath the enemy and only at the last moment operate both rigid machine guns. A flat straight-ahead flight with an attack on the body of the double-seater is absolutely to be avoided. It is wrong to shoot in an attack at distances of over 100 meters and if the opponent answers the fire, to turn. In this moment the enemy is offered a target which is easily hit and without danger to him.

Combat of the Double-Seater against Hostile One-Seaters

With early recognition of the opponent give the observer notice, while still at a long distance, by short fire bursts, so that he will not be surprised (thus saving ammunition). If the hostile one-seater attacks, then curve with full gas and bring observer into position to shoot.

In case of doubt, whether it is a hostile or our own aeroplane, curve toward it, press underneath it with full gas and, if the enemy is recognized, bring observer into position to shoot from beneath to above.

With a surprise hostile attack at once curve steeply with most powerful rudder stroke, bring the observer into position to shoot. It is fundamentally wrong, to fly straight ahead or—when with shut off gas—to go straight ahead downward.

The German reconnoitering aeroplane attacked by hostile one-seaters far beyond the line rids himself best of his bothersome opponents, by flying constantly zigzag, as long as the enemy attacks, thus bringing the observer into position to shoot. If the pursuer is lost out of the line of sight for a moment the German double-seater then at once pushes away under full gas and takes advantage of the high speed of the heavy aeroplane. Generally the pursuer does not succeed in overtaking a second time and approaching in an effective distance (50 to 100 m.). Should the one-seater still follow, shooting at 4 to 500 meters, then do not curve nor return fire, but first, quickly put in new drums, turn, push beneath the pursuer and to bring observer in closest distance to shoot upwards. Fundamentally the most dangerous one-seater is the one which tries to get underneath the tail of the double-seater.

Combat of the Double-Seater against Hostile Double-Seater

Here the movable machine gun of the observer brings the decision. The task of the pilot herewith is, to bring his observer as often as possible into position to shoot and to curve in such a way that the opponent is offered no aim. An attack of the double-seater with the rigid machine gun will often stupefy the opponent. On our side of the lines the double-seater has also the duty to attack as well as to take part in the air battle of German one-seaters in the vicinity.—Abstracts from a Post-war Paper on Pursuit Aviation by an Expert German Pilot.

ORDNANCE

TARGET PRACTICE BY ANTI-AIRCRAFT TROOPS—Anti-aircraft troops established an enviable record for efficiency in recent firings at Fort Monroe, Va., when the troops of the 61st Artillery Battalion (Anti-Aircraft) placed five shots within destructive range, out of twenty-two fired, at a target towed by a seaplane from the Hampton Roads Naval Air Station. This was the first time in the history of the American Army that firings have been conducted on a target towed by an airplane. The results accomplished mark a new era in the development of the American system of anti-aircraft defense, for it has been demonstrated that a target can be towed by an airplane for anti-aircraft target practice without danger to the pilot.

The target was in the shape of a sleeve, three feet in diameter and fourteen feet long. It was towed through the air at a speed of 60 to 80 m.p.h. by a cable 2,500 ft. long, which was fastened to Lieutenant Patterson's plane. Eight courses were flown from Rip Raps to Back River light, at altitudes varying from 5,000 to 7,444 ft. The sky was overcast and the target, which at times was obscured by clouds, appeared scarcely as large as a lady's stocking.

The anti-aircraft troops opened fire with both 3-in. guns and machine guns. The average range for the firing was 3,000 yd. While this is greater than the effective range of the machine guns, which were placed on special anti-aircraft mounts, excellent marksmanship was displayed as indicated by the use of tracer bullets which showed the line of fire to be through the target at practically all times.

That there is no danger for the pilot of the plane towing an aerial target, provided the gunners are well trained, is shown by the fact that although the tow line was 2,500 ft. long, the shot which came closest to the plane during the entire flight was 2,200 ft. behind the aviator. As

the seaplane used is much heavier than the average land plane which would be used for towing, and not so easily maneuvered, it is believed that any objection which aviators may have to towing targets for anti-aircraft firing has been overcome as the result of these tests.—*Aviation*, 11 December, 1922.

AMPHIBIOUS ARMY TANK.—An armored truck, with a three-inch regulation field gun mounted forward, traveled at the rate of twenty-five miles an hour on Riverside drive, New York city, negotiated the lower slope of the Palisades on the other side of the Hudson, and then crossed the river under its own power, in a test conducted December 6.

The demonstration was attended by Army and Navy officers and by several hundred members of the American Society of Mechanical Engineers who were attending the forty-third annual meeting of the organization. The truck was invented by Walter Christie, former driver of racing automobiles and designer of various sorts of gasoline motors.—*Army and Navy Journal*, 9 December, 1922.

SMALL ARMS FIRING REGULATIONS.—The Board for the Revision of Small Arms Firing Regulations has completed its work and is now engaged in preparing its report. The report will standardize the methods of firing and will provide for the proper firing courses for qualification made necessary by the new pay bill. The new regulations will greatly simplify the keeping of records and will probably eliminate all paper work.—J. B. H., 4 December, 1922.

NAVIGATION AND RADIO

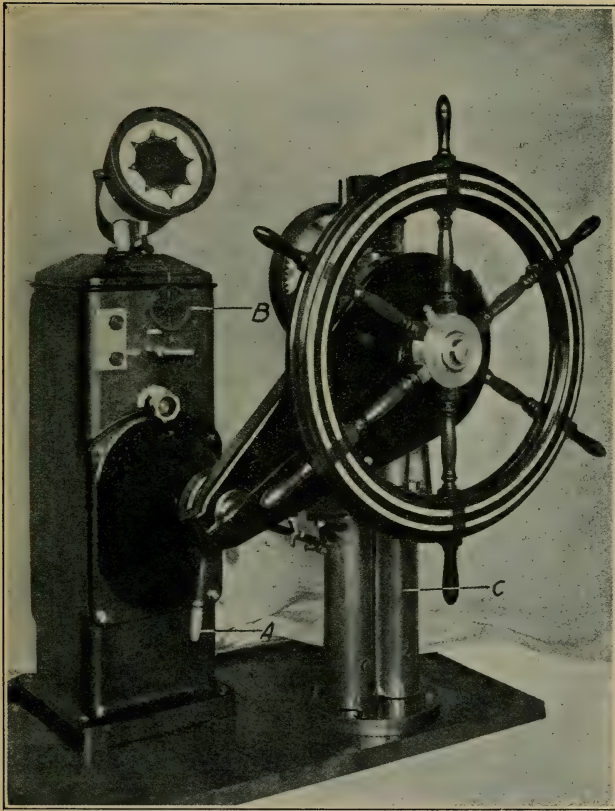
TO TEST NEW SOUNDING DEVICE IN PACIFIC.—Final plans are being completed by the naval authorities to dispatch two destroyers from San Francisco on an extensive tour to chart the bottom of the Pacific with the new type of sounding device, which operates on the principle of the speed of sound. A sound is sent from the apparatus to the bottom of the ocean and echoes back to the ship. The elapsed time is a measure of depth.

By this method efforts will be made to ascertain the depth of Nero's Deep, in the South Pacific. Nero's Deep is a hole in the floor of the ocean believed by many to be the opening of a tunnel connecting the Indian and Pacific Oceans. The deep has frustrated the effort of 25,000 fathoms of cable to reach its bottom.—*Army and Navy Register*, 25 November, 1922.

TWO KINDS OF FOG AT SEA.—"The physical condition of the South Atlantic during summer," by R. C. Mossman, is a valuable paper of a heretofore practically unknown region. In reviewing this for the *Monthly Weather Review*, H. H. Clayton has the following to say about the discussion of fogs:

"In regard to the fogs in that region he says, 'When a warm wind blows over cold water, the fog is generally very dense near the surface of the water, but has very little height, and occasionally it is possible to see over it from the masts of a ship. On the contrary when a fog is produced by the passage of a cold wind over water at a higher temperature the fog extends to much greater heights, but the base does not always reach the earth's surface; so that the visibility from the deck of a ship is very different in the two cases'."

The monograph was published by the Argentine meteorological bureau in 1922. It contains a number of maps and wind-rose charts.—*Bulletin American Meteorological Society*, November, 1922.



UNIT SYSTEM STANDING NEAR THE STEERING WHEEL AND TELEMOTOR C, A THE HANDLE FOR THROWING ON AND OFF, B LITTLE TILLER WHEEL, FOR SETTING COURSE AND STEERING SHIP THROUGH AUTOMATIC

SEEING BY WIRELESS TESTED IN PARIS.—Paris, Dec. 1.—Tele-vision, or "long-distance sight" by wireless was given a preliminary experimental demonstration at the Sorbonne today by Edouard Belin, inventor of the transmission of photographs by wire. Flashes of light were directed on a selenium element which, through another instrument, produced sound waves. These waves were then taken up by a wireless apparatus that reproduced the flashes of light on a mirror.

This was offered as proof that the general principle of projecting a stationary scene had been solved.—*Boston Evening Transcript*, 1 December, 1922.

AUTOMATIC STEERING.—If automatic steering is to be of the greatest value in controlling the ship's course, one of its paramount objects must be to suppress helm. The steering must be accomplished with the minimum of helm. I believe that only a few engineers and naval architects appreciate how great a resistance can be offered to the ship by even a small rudder angle, and it is this angle that must be suppressed. To do this, the act of anticipation becomes paramount, and the correction to course must be introduced long before an ordinary quartermaster would realize the necessity for change. This fact alone emphasizes the importance of a guiding element that is instantly and minutely responsive, to be employed as a base line so that the slightest departure from the course may be utilized to apply the correction.

No magnetic compass can ever be relied upon to do this. So difficult is this part of the performance that some workers have felt that they must go outside the gyro compass and introduce a quantity of highly organized and expensive auxiliary mechanisms for accomplishing the result. At least one worker has proposed to employ intricate gyroscopic elements as auxiliaries. All of these have been found unnecessary, inasmuch as within the last ten years ways and means have finally been developed that prove that in the gyro compass alone, with its instantaneous response to minute deviations of course, we have everything that is necessary to accomplish the purposes most effectively, even including the "easing off," "meeting," and full anticipation.—Extract from address by Elmer A. Sperry, before the thirtieth general meeting of the Society of Naval Architects and Marine Engineers, November 8, 1922.

MISCELLANEOUS

WHY THE NAVIES DO NOT MELT AWAY.—Each evening, a year ago this December, the papers told of some new progress at Washington toward freeing the world from the crushing burden of ever-increasing naval armaments. The Hughes proposals had been made and accepted in principle in November. On December 15 Japan accepted the 5-5-3 ratio; on the seventeenth a capital ship ratio of 1.75 for France as compared with our 5 was proposed, and it was accepted by France two days later. The limitation of navies was in full swing. Mid-December a year later shows the naval treaties ratified by Britain, America and Japan, but practically no "scrapping" done, ratification opposed in the French Chamber of Deputies, and the American Secretary of the Navy now insisting emphatically on our need of a Navy "second to none." In the French failure to ratify, the *Baltimore Evening Sun* sees the application of "the final quietus on the whole disarmament proposal." "The 5-5-3 ratio of navy building remains a dead letter," remarks the Washington correspondent of the *New York Call*, "in the face of England's unwillingness to be outdone by France, the French fear of Germany, Italian national pride, Japanese imperialism, and American democracy and equality with the other autocratic Powers." Yet the *Philadelphia Evening Public Ledger* sees hope

in the fact that "the United States, Japan and Great Britain have clean records so far as the Washington covenants are concerned."

What can we learn from the dispatches and editorials about the present status of disarmament and the possibility of fulfilment of those hopes which were so bright in December of last year? So far as our own Government is aware, we read in an Associated Press dispatch, no country which signed the Treaty has actually begun to scrap warships. The only real effect the Treaty has had is to suspend new capital ship construction in the United States and Japan, Great Britain having no ships under construction. We have heard about battleships being reduced to scrap iron in this country, Japan and England, but this, we are informed, "has affected only vessels which are formally classified by each Power as wholly obsolete for naval purposes."

Alarm is professed by *The Army and Navy Journal* over Japan's naval estimates. It sees Japan, in spite of the treaties, taking from us the position of world's second naval Power:

"We have put great numbers of valuable 'Treaty Navy' ships out of commission; a status in which but a handful of caretakers remain on board; so few as to be incapable of preventing rapid and serious deterioration. About 300 of the ships of the American Navy are now at docks in this condition.

"Nothing of the sort has been done in Japan. Her full quota of personnel renders such drastic measures unnecessary. We refrain from projecting any new ships. Japan's new building program comprises more than fifty new cruisers, destroyers, submarines and other types, all of a long range, essentially offensive type not at all necessary for her defensive needs as outlined in the Conference."

On the other hand, a Tokyo dispatch recently contained the information that the Tokyo and Washington Governments had exchanged assurances that their respective naval budgets would conform to the Treaty. And the *Indianapolis Star* gives the Japanese credit for observing the spirit of the limitation treaties in getting out of Siberia, Shantung, and Sakhalien; in abolishing the naval port of Port Arthur next month; in promising to convert the naval base of Malzuru into a naval station next April; in dropping more than 12,000 men from the Navy personnel on December 1; and in proceeding to scrap three battleships.

A British Admiralty official announced at the end of last month that "eight British capital ships have been rendered useless for war purposes," six more made "incapable of war risk service," and two more will be "similarly dealt with" by the end of December. But he concludes: "Now that Great Britain's intentions have been shown, we undertake that no more ships shall be dealt with until the other countries have acted." The Washington understanding of what Great Britain has done under the Treaty, however, is stated as follows by the Associated Press:

"The British Government had placed contracts for two super-Hoods just before the Conference met, and canceled these contracts when the agreements were first reached. So far as known here, this cancellation is the only 'scrapping' of war vessels under the Treaty which has been carried out by the British."

In France the naval Treaty has had hard sledding of late in the Chamber of Deputies, the Foreign Affairs Committee having voted against recommending ratification. The chairman of the committee has been quoted as saying that, "If ever we approve it there will be so many vital reservations to the Treaty that it will not be recognizable." The present French attitude brings criticism from the *New York Times*, *Dayton News* and *Buffalo Express*. But *The Army and Navy Journal* accepts the French view that sea power greater than that allowed by the Washington Treaty

is essential to France to enable her to draw on her colonies for troops in case of war.

Our own Secretary of the Navy, in his recent report, points out that the United States, by letting its Navy personnel decrease, and by failing to build non-capital ships which are not affected by the Treaty, is allowing its Navy to drop below the equality with Great Britain's which the Washington arrangements call for. While Mr. Denby does not expect Congress to make any additional appropriations at present, he does call for such an increase eventually "as will tend to balance our fleet and keep it the equal of any in the world."—*The Literary Digest*, 16 December, 1922.

SCRAPPING DELAYED BY U. S. AND JAPAN.—Washington, December 19.—Responding to a House resolution, Secretary Denby transmitted to Congress today the information in the hands of the Navy Department on the status of warships scrapped under the terms of the Washington Arms Conference naval treaty or otherwise disposed of by the signatories since the adjournment of the Conference.

The report showed that neither the United States nor Japan plans to complete the scrapping of any existing capital ships, at least pending promulgation of the treaty, although both nations have stopped work on large building programs of capital ships. Great Britain, on the other hand, was shown to have disposed of or to be disposing of a very considerable number of older capital ships.

U. S. Has Sold Two Ships

The United States, according to the report, in addition to suspending work on vessels under construction under the treaty, has decommissioned all completed ships affected except the battleship *Connecticut*, which soon will be placed out of commission, and has sold the *Maine* and the *Missouri*, which actually are being broken up.

Great Britain, Mr. Denby said, had at the time his information was gathered, but which was not indicated, broken up three capital ships; sold to be broken up, seven; sold but not dismantled, one; completed mutilations on two and was engaged in mutilating six others. The Australian Government, he added, had decided to scrap the battle cruiser *Australia*.

Japan Does Preliminary Work

Through her Ministry of Marine, the Secretary continued, Japan "had stated that while work preliminary to scrapping will be done, the hulls will not be broken up or sunk until the treaty has been ratified by all the powers." Certain preliminary work involving removal of guns, turrets, armor and engines was being done, he said, on seven capital ships, three others had been placed in the fourth reserve and work had been suspended on six. Work on two others was proceeding with the evident intention of completing them as aircraft carriers, permitted under the naval treaty.

Neither France nor Italy was required to scrap any completed vessels by the treaty. One of the ships France was permitted to retain, Mr. Denby said, had been wrecked and that nation proposed to complete, as an aircraft carrier, one of the five battleships it had under construction at the beginning of the war.

One Ship Sold By Italy

Italy, Mr. Denby said, had disposed of one battleship under construction and had annulled contracts for three others. In addition, the *Leonard Da Vinci*, a battleship permitted under the treaty, had been wrecked and would not be reconstructed.

Discussing ships not affected by the treaty, Mr. Denby said the United States had disposed of twenty-five submarines, one destroyer, two monitors and one dynamite gun vessel. Great Britain, he added, had lost three auxiliaries by sinking and had disposed of thirty-eight lighter vessels, including twenty-four submarines. One Japanese battleship, he continued, and thirty-three smaller vessels had been removed from the effective list, and one light cruiser had been wrecked. France had disposed of one battleship, four cruisers and nine torpedo boats.—*Baltimore Sun*, 20 December, 1922.

BRITISH AND FOREIGN FLEET REDUCTIONS.—So far as can be ascertained, Great Britain is the only Power which has begun to carry out the scrapping of important ships condemned under the Washington compact. Not one of her Dreadnaughts in that category now remains in an effective condition. Some have already been broken up in home or foreign yards; others are partially demolished, and the remainder, stripped of all fighting equipment, will be reduced to scrap metal as soon as the shipbreakers are ready for them. The vessels thus discarded range from the original *Dreadnaught* to the 13.5-in. gun ships of the *Thunderer* class—the nameship of which has been reprieved for a few years by the sacrifice of the *Erin*—and include six battle cruisers. The total of all-big-gun ships already scrapped or dismantled amounts, therefore, to seventeen.

Nothing equivalent to this wholesale destruction of really valuable material is reported as yet from either the United States or Japan. According to a recent communiqué by the Japanese Embassy in London, the 12-in. armament and the turrets of the battleships *Kashima*, *Ikoma*, and *Kurama* have been dismantled, but these three vessels are, of course, pre-Dreadnaughts, which would in any case have disappeared shortly on the grounds of obsolescence. The communiqué adds that the *Kaga* and *Tosa* are to be used for target practice before they are broken up, and that "all the capital ships to be scrapped have been relegated to the fourth Reserve Fleet, and preparations are practically completed for the work of demolition on the majority of them." It is clear from this that the work has not actually been started. Apart from uncompleted ships, the most important units to be broken up are the semi-Dreadnaughts *Aki* and *Satsuma* and the Dreadnaught *Settsu*. These vessels, it would appear, remain intact for the time being. It is, in fact, most unlikely that any of the Japanese all-big-gun ships, whether complete or incomplete, will be handed over for demolition until the Washington treaty has been fully ratified.

The same cautious policy is, it would seem, being pursued in the United States. The latest news from Washington gives no indication of breaking-up operations having started on the surplus Dreadnaught fleet. The thirteen unfinished ships earmarked for scrapping remain on the stocks in the condition in which they were left when work upon them ceased some eleven months ago, and no orders have been given to dismantle any of the four completed vessels doomed by the treaty: viz., *Michigan*, *South Carolina*, *Delaware*, and *North Dakota*. As regards pre-Dreadnaughts, the majority, it is true, have been withdrawn from service, but it is doubtful whether all of them have been rendered ineffective. Moreover, it has been intimated pretty clearly that definite orders for the scrapping of useful ships surplus to the treaty standard will not be issued until and unless that document has been ratified all round.

These facts imply no reflection on the good faith of either the American or the Japanese Governments, both of which are entirely within their rights in postponing the operation of a diplomatic agreement which has not yet received the final assent of all the signatories. They do mean,

however, that in the event of the treaty breaking down owing to non-ratification in one quarter or another, both the United States and Japan would be able to resume the development of their respective navies practically at the point where they left off, having rid themselves in the interval only of such obsolete material as would have been scrapped, or at least placed in reserve, in the course of a year or two. Great Britain, on the contrary, would find herself bereft of a number of really valuable ships, which but for the agreement would most probably have been kept in the service for several years to come. Opinions may differ as to the wisdom of the somewhat precipitate action which has been taken with regard to the scrapping of the early Dreadnaught fleet. The fact remains that these ships have been relinquished without any corresponding reduction having taken place in the strength of foreign navies.

It is difficult to obtain precise information respecting the weeding out of obsolete material in the Continental navies. France was reported not long since to be scrapping, or preparing to scrap, a considerable number of her older ships. Among those mentioned as condemned were the cruiser *Jurien de la Gravière*, launched in 1899, the machinery of which is said to be worn out as the result of continuous steaming at high speed when she was running as a despatch vessel between Toulon and Malta during the war; the *D'Estrées*, a smaller ship, also dating from 1899, which, it is understood, will be replaced on the China Station by the *Colmar* (ex-German *Kolberg*) and the old *Lavoisier*, which is apparently still effective, though her name has disappeared from the textbooks. Italy, according to the latest semi-official lists published in that country, has scrapped scarcely any of the war vessels that she possessed at the close of the war, and is even retaining such nondescript craft as the floating batteries (*Grappa*, *Monte Santo*, *Faa' di Bruno*, etc.) which were built for coast defense and bombardment purposes. Nearly all the old destroyers and torpedo-boats continue to figure in the list of effective material. Nowhere, therefore, is there any counterpart to the ruthless scrapping which has gone on in Great Britain since the armistice.

The French papers have published illustrations of the submarine *Requin*, now under construction at Cherbourg. She is one of the batch of six 1,200-ton boats voted in the first post-war program, which also includes six boats of 600 tons. One view, evidently taken a few weeks back, shows the *Requin* to be well advanced, with her inner hull practically complete. Although a fairly large boat, the *Requin* is by no means the heaviest submarine now building. The *K 26*, completing at Chatham, is larger by about 680 tons; Japan has several 1,500-ton boats in hand, with larger ones in contemplation; and the United States is building three "fleet submarines" of 2,025 tons. On the whole, however, such underwater craft as have been laid down since the war are not as large as might have been anticipated, and with the possible exception of the latest Japanese boats—details of which are vague—no Power has yet laid down a submarine comparable in dimensions to the German "Untersee-Kreuzer" No. 124. The largest submarine actually in commission today is the French *Halbronn* (ex-German *U-139*), which displaces 1,930 tons on the surface and 2,480 tons submerged. One reason why the dimensions of these craft are being kept within fairly modest limits is the formidable cost of larger boats. Nowadays it would tax the financial resources of any nation to build a fleet of submarines equivalent in size and power to the *U-142*, nor is it by any means certain that these very large boats have a military value proportionate to their cost.—Hector C. Bywater in *The Naval and Military Record*, 22 November, 1922.

FURTHER NAVAL LIMIT PROPOSED.—Washington, December 16.—The sentiment of the House of Representatives concerning the pending proposal to authorize President Harding to negotiate with Great Britain, France, Italy and Japan with a view to an international agreement limiting the construction of military ships and submarines of less than 10,000 tons and aircraft was indicated this afternoon by the adoption of a special rule by which this proposal was made "in order" as part of the Naval Appropriation bill. The special rule was adopted by 251 to 9.

The object of the rule was to prevent the elimination of the proposal from the naval measure. As new general legislation the proposal under the rules of the House has no place in an annual appropriation bill, and a point of order against its incorporation in the bill had been made. While the House merely corrected a technicality, the heavy vote is indicative of the desire of a large majority of the membership to have the proposal considered.

Disarmament Move in Senate

Another move in the interest of reducing armaments was made in the Senate this afternoon by Senator King of Utah. He offered a resolution proposing an international conference to consider the reduction and limitation of armament on both land and sea. The resolution follows:

"Be it resolved that the President is hereby authorized and requested to invite the Governments with which the United States has diplomatic relations to send representatives to a conference to be held in the City of Washington, which shall be charged with the duty of formulating and entering into a general international agreement by which armament for war, either land or sea, shall be effectually reduced and limited in the interests of the peace of nations and the relief of all nations from the burdens of inordinate and unnecessary expenditures or the provision of armaments and the preparation of war."

Senator King made no remarks in presenting the resolution. It was referred to a committee.

The proposal for limiting the construction of warcraft under 10,000 tons is the last paragraph of the Naval Appropriation bill, reported to the House by the Committee on Naval Affairs. This paragraph reads as follows:

"The President is requested to enter into negotiations with the Governments of Great Britain, France, Italy and Japan with the view of reaching an understanding or agreement relative to limiting the construction of all types and sizes of sub-surface and surface craft of 10,000 tons standard displacement or less, and of aircraft."

Comparison of Strength

The Navy Department has sent to the House Naval Committee tables containing data regarding modern combatant ships whose numbers are not affected by the naval treaty negotiated at the Washington Conference on limitation of armaments and ratified by the Senate. These tables are for the committee's use in connection with the naval bill proposal.

It is shown by the tables that the United States has no first line cruisers of 8,000 tons or more capable of twenty-seven knots speed, while Great Britain has four, with a tonnage of 56,700, Japan has no vessels of this type. Nor has the United States any first line light cruisers of more than 3,000 tons and capable of twenty-seven knots speed, while Great Britain has forty of these and Japan has ten.

Both Japan and the United States are lacking in "flotilla leaders" of more than 1,500 tons, but Great Britain has sixteen of them.

Of first line destroyers, from 800 to 1,500 tons, the United States has 281, against 185 for Great Britain and 53 for Japan. Neither Japan nor

Great Britain has any light mine layers, but the United States has fourteen. Fifty-nine first-class submarines of from 500 to 1,000 tons are owned by the United States, against thirty-six by Great Britain and twenty-eight by Japan.

Fleet submarines of more than 1,000 tons and capable of more than twenty knots speed number three in the American fleet and six in the British fleet. Japan has none. Great Britain has seven mine-layer submarines, but none of this type is owned by Japan or the United States. Great Britain has also three first line monitors, a type not now found in the United States and Japanese navies, and she also has three monitor submarines, with none of this type to the credit of the United States or Japan.

In aircraft carriers of the first line the United States is lacking but has one aircraft carrier of the second line. The construction of aircraft carriers is limited by the naval treaty. Great Britain has one aircraft carrier of the first line and three of the second line. Japan has one aircraft carrier of the second line. The tonnage of aircraft carriers permitted under the naval treaty is 135,000 each for Great Britain and the United States and 81,000 for Japan, but aircraft carrier tonnage of the United States is now only 12,700, of Great Britain 43,700 and of Japan 9,500.—*New York Times*, 17 December, 1922.

WEAKNESS IN OUR NAVY.—Washington, November. 19.—If the American Navy is to achieve and maintain the 5-5-3 ratio laid down at the Disarmament Conference, and if it is to have sufficient fighting strength to insure the safety of the nation in the future, it must—

Convert two partially completed cruisers to aircraft carriers and build a third one.

Build twenty 10,000-ton cruisers with maximum armament permitted by the Naval Treaty, and

Build twenty-four powerful submarines with the greatest possible armament and radius of action.

This is the conviction of Rear Admiral William L. Rodgers, chairman of the executive committee of the General Board of the Navy and a late member of the Advisory Council of the American delegation to the Arms Conference.

"As passed, the naval treaty," said Admiral Rodgers, "applied only to capital ships and airplane carriers. In all other classes of ships of war there is no limitation. The American proposal of last winter had the actual status quo as its chief basis, although not rigidly adhered to.

"The treaty was very specific as to capital ships: When the United States shall have completed the *Colorado*, and the *West Virginia* and scrapped the *North Dakota* and *Delaware*, and when Great Britain has completed the two new 35,000-ton ships, the construction which will be undertaken, so their Admiralty announces, in the near future, and has scrapped four ships of the *King George V* class, the capital ship tonnage will be:

United States.....	525,850
Great Britain.....	558,950
Japan	301,320

"In so far as capital ships go," the admiral continued, "the United States has, by the treaty, only a small inferiority of tonnage, and of four ships in number as compared with Great Britain, and is one and two-thirds that of Japan. The inferiority with regard to England will be reduced as time goes on by the disappearance of the other ships."

Taking up the matter of aircraft carriers, which are becoming more and more important, the admiral said:

"The treaty provided a maximum tonnage of aircraft carriers as follows:

United States.....	135,000
Great Britain.....	135,000
Japan	81,000

How Aircraft Problem Looks

"The United States may convert two of the partially completed battle cruisers to aircraft carriers, if it so desires. At present the three powers have in commission or under construction or authorized, the following aircraft carriers:

United States.....	1 vessel, 12,700 tons
Great Britain.....	6 vessels, 82,550 tons
Japan	3 vessels, 29,900 tons

"In view of the growing importance of aviation as an indispensable auxiliary to a fleet, it is not to be supposed that Great Britain and Japan will fail to build up to the tonnage allowed. To maintain equality the United States should, therefore, at once proceed to the conversion and completion of aircraft carriers of two partially completed battle cruisers and at least one additional aircraft carrier of 27,000 tons."

Discusses Cruiser Situation

Dealing with the question of cruisers, another phase of naval strength that is of importance, the admiral said:

"The cruiser tonnage allowed the various powers is unlimited. In instituting comparisons and estimating our needs, we must exclude all old vessels of less than 27 knots speed. The apparent situation will alter from year to year, according to the progress of the various building programs.

"At present the best information indicates there are in existence, building or authorized for the three years, the following tonnage in cruisers of 27 knots or above:

United States.....	75,000
Great Britain.....	252,000
Japan	176,400

"Our cruiser tonnage is, therefore, 177,900 below that of Great Britain. To have one and two-thirds the tonnage of Japan, we need an additional 219,000 tons of cruisers."

Question of Destroyers

Considering the question of destroyers, the admiral pointed out:

"The United States is decisively superior to Great Britain and Japan in destroyers, due to our emergency war program to combat submarines. The destroyer tonnages are:

United States.....	334,917
Great Britain.....	247,546
Japan	104,960

"It should be noted that at present the United States has only 126,360 tons of destroyers in commission. The remaining 207,000 tons is out of commission because there is no personnel to man them. The delicate high-pressure machinery of these vessels is much more susceptible to deterioration when out of commission than when there is a crew on board to care for it. If this condition lasts a few years longer we cannot count on destroyer strength of much more than the vessels that are kept in commission.

Limitations of Destroyers

"It may, perhaps, seem that our excess destroyer strength offsets our deficiencies in cruisers. This is not wholly true. Destroyers have not the armament, radius of action, nor ability to make speedway in a seaway to enable them satisfactorily to perform the indispensable functions of cruisers in wartime."

Taking up the matter of submarines, the admiral continued:

"In comparing submarines, they must be treated in two classes; small boats and large boats. The first class (1,000 tons or less) are limited by their small size and radius of action chiefly to a coast defense rôle. Their importance will probably diminish with the development of aircraft for this purpose.

"Boats over 1,000 tons are susceptible of great development and consequent usefulness. They can be given adequate armament and great radius of action, thus rendering them to a degree independent of shore bases. They can be used offensively against an enemy without resorting to the horrors and ruthlessness employed by the Germans in the late war.

Gives Tonnage of Submarines

"The tonnage of small submarines in existence, building or authorized by the three Powers, is:

United States.....	66,695
Great Britain.....	40,253
Japan	42,714

"It will thus be seen we are considerably in excess of Great Britain, but some 5,000 tons below our ratio when compared with Japan. When we compare large submarines (over 1,000 tons for fleet use) we find:

United States.....	9,693
Great Britain.....	19,960
Japan	32,655

"To attain equality with Great Britain, we require an additional 10,000 tons, while to reach one and two-thirds the strength of Japan, we require an additional 45,000 tons."—*Baltimore Sun*, 20 November, 1922.

INFLUENCE OF AIR RECONNAISSANCE ON STRATEGY AND TACTICS

IX. NAVAL INFORMATION.—In reading the accounts or histories of modern naval engagements, the predominant impression left on the mind of the reader is the surprising ignorance of the enemy's position and of his movements under which commanders labored. Even in regard to the dispositions of his own forces the naval commander is often uncertain, as witness the action in the Heligoland Bight, August 28, 1914.

Naval battles have hitherto been fought under conditions which it is difficult for the landsman to imagine. The latter can hardly visualize an engagement in which the commander is only vaguely aware of the strength and locality of his enemy; but then a military engagement does not take place between widely separated combatants moving at high speeds. A landsman, however, could give a reason, and a not inaccurate reason, as to why the naval engagements of the late war, with the exception of those with von Spee's squadron, bore that indecisive character which the traditions of Trafalgar and of the Russo-Japanese war would hardly have led one to expect.

That reason is—lack of information about the enemy.

To fight a successful battle, and it does not matter whether the battle is on land, on sea or in the air, a commander must know the enemy's

locality, his strength, his dispositions, his movements and his losses. Without a knowledge of these, he will certainly not fight with success, and it is more than probable he will be defeated. The modern naval commander has not had all this information; in some cases he has not had any of it. It would, therefore, be safe to assert that the methods hitherto employed to obtain information are not a success; other means of obtaining information must be found. It is obvious that there is little use in spending vast sums of money in building gigantic battleships, if, when the occasion arises, these craft are unable to find the enemy in order to deal him the blow which their strength renders possible. Again there is little use in fitting these vessels with super long-range guns with which to open fire on the enemy at great distances, unless a means is found of bringing the fire of these great guns to bear on the enemy with accuracy.

The lesson of the biggest naval engagement of modern times is that the methods of reconnaissance and observation of fire then employed were inadequate; the aeroplane must be substituted for these methods. With adequate air observation it would have been impossible that the Grand Fleet should have passed over the spot where the retreating High Seas Fleet had been an hour previously and yet have been unaware of the proximity of the latter, as in fact happened immediately after Jutland.

X. THE ACQUISITION OF INFORMATION. PAST AND FUTURE METHODS.—

As on land, information about the enemy is the foundation of all ideas and actions in naval warfare. Prior to the lessons taught by the late war it was assumed that this information could be acquired by:

- (a) Espionage.
- (b) Cruisers
- (c) Submarines.

Espionage plays an even more important rôle in naval than in land warfare, for it was through the medium of espionage that the following was formerly discovered:

- i. The exact location at their bases of the units comprising the enemy's fleet.
- ii. Information as to any subsequent changes.
- iii. Departure and arrival of enemy submarines.
- iv. Departure and arrival of enemy merchant vessels.

Prior to the advent of the aeroplane none of this information could be obtained by any but the above means, though submarines might furnish irregular reports as to the latter.

Cruisers were relied on to furnish information as to the strength and disposition of the enemy fleet at sea, especially immediately preceding battle; but their necessarily inferior armaments limits their approach to the hostile fleet, with a consequent deterrent effect on the value of their information. In fact the cruiser was in very much the same position as that in which the cavalry found itself in the opening stages of the war, as explained in Part I., Section 2. It is not, however, intended to indicate that cruiser reconnaissance is valueless, but rather is it suggested that more detailed information can now be obtained far more quickly, and at less risk, by means of new methods—chief of which is the aeroplane. Under certain conditions cruiser reconnaissance may still be necessary, but it would nevertheless be safe to assert that, granted efficient air forces are available, the energies of the light cruiser may be directed into profitable channels: *e.g.*, commerce raiding, commerce protection, and fleet protection.

Submarines.—It has been said of the submarine that "it is the ideal sea scout, because it can evade the enemy's outer guard, and ascertain from close quarters his real inner strength or weakness; can wait and watch quite

unknown to the enemy; and at the same time it can, if occasion offers, deliver an attack on the largest warship with reasonable chances of success."¹

That the submarine has obvious advantages as a slow but certain medium of reconnaissance is beyond doubt, and if, as Mr. Domville-Fife suggests, it could make its observations unknown to the enemy, its value would be largely increased. But can the submarine make its investigations unobserved by the enemy anti-submarine reconnaissance aircraft? The same author admits in an earlier stage of his book that the most deadly enemy of the submarine will be the heavily armed aeroplane or seaplane. If this is true it is hardly safe to count on the submarine as a secret method of watching the enemy.

That the submarine can deliver an attack against the largest warship, while lying to off an enemy base, is also true, but this is a combination of offensive and reconnaissance duties which can also be done in the case of aircraft. Experience, however, teaches that such a combination of duties does not produce the best information, be it on land, on sea or in the air.

The chief objection to submarine reconnaissance is the slowness with which the information will reach its destination. Information, to be of value, must be early, and this the submarine cannot supply. It can, of course, report by wireless, but this reveals its presence to the enemy, and, in addition, the wireless range of a submarine is extremely limited. The present wireless range of the average submarine is one hundred miles—far too small a range to be of value, though on occasions it will allow a submarine to report information acquired at sea in the course of other duties.

Thus, though the submarine and the cruiser may still supply valuable information, it is certain that they cannot compete with the air as a medium of reconnaissance; consequently their energies should be mainly employed in other spheres, where they are likely to prove more useful.

The outstanding features of air reconnaissance are, as in land warfare:

- (a) Speed—Early information.
- (b) Radius of action—Wide information.

It is true that the aeroplane is sometimes influenced by the adverse weather conditions so often prevailing at sea, but this is a factor which affects all other forms of reconnaissance, though to a lesser degree. As regards darkness; the development of the parachute flare will render the aeroplane more and more efficient for observation purposes by night. The Americans have produced and used a flare of over 500,000 candle power which illumines an area of over five square miles. Thus, almost immune from hostile action itself by reason of the darkness above the flare, the aeroplane will be capable of accurate observation by night.

XI. TYPES OF AERIAL RECONNAISSANCE.—Air reconnaissance in naval warfare may be divided into three categories, of which the first may already be reckoned as obsolete for reasons given below:

- i. Airships. Extreme distances.
- ii. Sea reconnaissance carried out by aircraft based on shore, chiefly observation of hostile submarines and protective reconnaissance for home bases.
- iii. Fleet reconnaissance carried out by aircraft based on aircraft carriers or by flying boats. Strategical reconnaissance, and tactical reconnaissance during battle.

Airships.—Though Lord Beatty declared that one airship was capable of doing the work of six cruisers,² it is doubtful if it has a future in

¹ "Submarines and Sea Power." C. Domville-Fife.

² "The First World War," Vol. II. Colonel Repington.

reconnoitering work by reason of its vulnerability to attack by heavier-than-air craft. A fleet at sea which is approached by one of these airships can despatch one or two fast-climbing single-seaters from an aircraft-carrier, and the experience of the late war teaches that, once attacked by single-seaters, the airship has little chance of regaining its base. The production of helium gas in large quantities may alter the war status of the airship, but even then it is still much affected by weather conditions. Its advantages for reconnaissance purposes at sea are obvious, but it is doubtful if these advantages will ever outweigh its inherent disadvantages. During the earlier part of the late war, there is no doubt that the German Zeppelin service performed the most valuable reconnaissance work in co-operation with the German navy, and the immunity with which the High Seas Fleet could occasionally venture forth was due entirely to excellent air reconnaissance which ensured the absence of the Grand Fleet from the waters about to be patrolled by the German Fleet. At Jutland the Germans are thought to have had some Zeppelins, but their value was lessened by adverse weather conditions. On the following day, however, they kept the Grand Fleet under observation throughout the whole day. From the beginning of 1917 onwards, Germans reconnoitering airship activity was paralyzed by our fighting aircraft, and for this reason it is difficult to foresee any immediate future for the airship in reconnaissance.

Sea or Ocean Reconnaissance.—The degree of activity in this form of reconnaissance will in some measure be dependent on the distance of enemy waters from the air bases of the ocean reconnaissance units. If the enemy naval base is within radius of action, these shore based aircraft can acquire valuable information as to his activity. In narrow seas such as the Baltic and Adriatic all reconnaissance, including a certain amount of fleet work, could be undertaken by shore-based aircraft. Submarines and merchant shipping reconnaissance, in fact all forms of ocean reconnaissance, comes within the scope of aircraft based on shore.

Fleet Reconnaissance.—This will normally be carried out by aircraft operating from mobile bases (aircraft carriers) which accompany the fleet to sea. Within this category must also be included the large flying boat which may, in the future, accompany the fleet by re-fuelling at sea.

The work of fleet aircraft may be classed broadly under two headings:

- (i) Before battle.
- (ii) During battle.

"Before battle" will include normal fleet reconnaissance, which should report the presence or otherwise of the enemy, the presence of mines or submersible craft and their location. If the enemy fleet is seen to be at sea, the information will be passed back at once to the admiral, who will despatch immediately a strong force of fighting aircraft to secure superiority at the decisive time and point, thus enabling the reconnaissance aircraft to acquire early detailed information unimpeded by enemy opposition. Thus as he comes into battle the admiral will have accurate information as to the position and strength of the enemy, while at the same time his fighting aircraft will endeavor to deny similar facilities to his opponent. It should be mentioned that as he moved forward at Jutland, Viscount Jellicoe had only a vague idea as to the enemy's position; his cruiser reports, as he himself says, being few and inaccurate.¹ It should also be mentioned that one of the few British aircraft available sent in an accurate report by wireless concerning a part of the German Fleet, this in exceptionally unfavorable weather and at a time when the reconnoitering abilities of aircraft were lightly valued by naval authorities.

¹ "The Grand Fleet." Viscount Jellicoe.

"During battle" the commander must be kept informed on the following:

- (a) All changes of course and of formation in the enemy's main battle fleet.
- (b) The approach of any supporting force.
- (c) Enemy submarines.
- (d) Position and movement of enemy destroyer flotillas, paying particular attention to the likelihood of a combined torpedo attack.
- (e) Position and movement of enemy battle and light cruisers if not in action with the main fleet.

In addition, during battle there is the work of the fleet-spotting aircraft. These should, if possible, operate from separate carriers, so that they will not interfere with the arrival and departure of the reconnaissance aircraft.

In regard to (a) above it should be noted that at Jutland, Viscount Jellicoe was unaware that the German Fleet had turned away until about twenty minutes after it had done so.¹ To this fact (in other words to poor reconnaissance on our part) the Germans owe no small measure of their escape. The Battle of Jutland proved the inadequacy of the methods of reconnaissance used.

Cruisers of other craft detailed to intercept enemy commerce-raiders should carry a seaplane, which in a single reconnaissance could cover a wide area in a short time, establishing the presence or otherwise of the enemy vessel in that area. Such a policy would undoubtedly shorten the career of these destructive vessels. Had Admiral Milne had a seaplane at his disposal he would have been able to locate the *Goeben* and *Breslau* hiding among the Ægean Islands from August 8-10, 1914, awaiting Turkish permission to enter the Dardanelles. As it was, his only cruiser, the *Weymouth*, could not search all the ground in so short a time; the enemy escaped, with what disastrous results are well known.

XII. INFLUENCE OF AERIAL RECONNAISSANCE.—In considering this subject it must be borne in mind that circumstances have shown other methods to be inadequate, consequently the air may be said to be the only means of acquiring information (apart from espionage) in naval warfare; this, therefore, is its outstanding quality. Other effects may be summarized as follows:

- (i) Supplies early information which will eliminate the uncertainty previously associated with the modern naval engagement.
- (ii) Reduces the possibility of surprise.
- (iii) Enables the enemy to be watched consistently at his base.
- (iv) Permits observation in close proximity to strong enemy forces without naval tactical support.
- (v) Furnishes a means of reconnaissance against which naval craft cannot exercise deterrent effect.
- (vi) Increases the area which a stronger belligerent can search in his endeavor to find the enemy. (In 1898 Cervera's Fleet was in Santiago Harbor for a month before the Americans located him.)
- (vii) May hasten a more general adoption of the submersible craft. This is, however, somewhat remote and need not for the present be considered.

CONCLUSION.—In both land and sea warfare the aeroplane has shown itself to be not only a superior method of acquiring information about the

¹ "The Grand Fleet." Viscount Jellicoe.

enemy, but in many circumstances the only method. It is not only capable of saying where the enemy is, but it can report his movements and his position in depth; that is, it can do more than "feel the fringe" as the French say: it can report on enemy activity and on his reserves far behind the immediate battle front.

On the other hand it must not be supposed that aerial reconnaissance will revolutionize warfare, or render the conduct of war more easy for the commander in the twentieth century than for his predecessor of the Napoleonic era. The speed and accuracy with which the aeroplane can supply information is merely a factor which allows the individual to march with the progress of science in war. By the introduction of new and more difficult weapons, science has rendered the art of war more complicated, but science does not forget to neutralize its own efforts by placing in the hands of a commander facilities, such as the aeroplane, which will at least permit him to keep pace with its progress. Thus there is nothing about the aeroplane and its employment on reconnaissance which will lead to any modification in the principles of war. It is in the application of war to the methods of warfare, that new influences have their effect, and within these limitations this is likely to be profound. The effect of the introduction of aircraft is, therefore, similar to any other innovation of war. That is, the leading principles of war are unalterable, but the application of these principles is affected by the introduction of new weapons and new inventions.—By Flight Lieutenant C. J. Mackay in *The Journal of the Royal United Service Institute*, November, 1922.

MODERN TORPEDO CRAFT.—Before the war Great Britain and Japan were the only Powers that attached major value to the gun armament of destroyers; in fact, the tendency here was to develop these craft as very swift gun-vessels, the torpedo armament being considered as of secondary importance. The result was that many of our destroyers in 1914 could train three 4-in. guns on the broadside, but no boat mounted more than four tubes, and the majority had only two. Although this neglect of torpedo power was probably a mistake, war experience soon vindicated the wisdom of our designers in giving these boats a formidable battery of guns, for in every artillery action between the contending light forces, the Germans came off second best. This point was emphasized in the letters of Admiral von Pohl, who complained that his destroyers were unable to face the British on account of the latter's superior weight of gunfire. German boats of the war program were therefore designed to carry three and, in some cases, four 4.1-in. guns, a weapon whose heavy shell and high elevation gave it a decided advantage over our 4-in. In the twelve special destroyers, or flotilla leaders, of the 1916 type they even went to the length of mounting four 6-in. 40-cal. guns.

We on our part increased the armament of larger destroyers to four 4-in., so arranged as to give an axial fire of two guns, and with increased elevation. In the *W* class, begun in 1918, four 4.7-in. guns were mounted, together with six tubes. A number of exceptionally powerful flotilla leaders were also built; i.e., *Bruce Campbell*, *Douglas*, etc., displacing 1,800 tons, with machinery of 40,000 s.h.p. for a speed of 35 knots, and an armament of five 4.7-in. guns, one 3-in. A.A., and six 21-in. torpedo-tubes.

A comparison between typical destroyers of the pre-war period and those of today reveals the striking progress which has been made in dimensions, speed, and offensive power. There are now afloat so-called destroyers which surpass the old third-class cruiser in tonnage and armament, and are, of course, immeasurably swifter. Having built about 260 boats to a standard design which was prepared before the lessons of the

war had been fully digested, the United States Navy has a type of destroyer which is inferior in artillery power to the latest foreign craft, though it carries a remarkably heavy torpedo armament. The American flush-decker class displaces 1,215 tons, can steam at 35 knots, and has a very extensive radius of action. It mounts four 4-in. guns (5-in. in a few boats) and twelve 21-in. torpedo-tubes.

Japan has lately given up the construction of second-class destroyers—that is, under 1,000 tons—and is now building only those of the first class, which range from 1,150 to 1,500 tons. Her latest boats are designed to 36 knots, and the armament may be increased to five 4.7-in. guns, with six or eight tubes. Ever since the war with Russia, Japanese boats have been heavily armed in proportion to displacement, the 4.7-in. gun having been introduced into the larger types as far back as 1908. For reasons of economy the big “torpedo cruisers” designed in 1920 have not been proceeded with. These vessels were to have displaced 2,400 tons, with a speed of 37 knots, and would have been armed with four 5.5-in. or six 4.7-in. guns and eight torpedo-tubes.

The two largest destroyers now afloat are the French *Amiral Sénès* and the Italian *Premuda*, both ex-German boats of the 1916 type. Their leading particulars are: Displacement, 2,485 tons; machinery, 54,000 s.h.p. and 35 knots; armament, four 5.9-in. guns and four 23.6-in. tubes. France, however, is building twelve destroyers of yet greater dimensions. They are of 2,553 tons, with machinery of 48,000 s.h.p. for a speed of 35.5 knots. Contradictory reports have been current respecting their armament. They were first intended to carry six 5-in. guns on twin mounts, besides two 3-in. A.A. and six 21.6-in. torpedo-tubes. It was recently stated that experiments with the *Amiral Sénès* having shown the difficulty of combining good seagoing qualities with the ponderous top-weight of large caliber guns, six or more 3.9-in. would be substituted for the 5-in. I understand, however, that the French Ministry of Marine has again reverted to the original plan of six 5-in. guns on three twin mounts. Should this be confirmed, the new boats will be the most powerful of their type in the world. The twelve smaller destroyers of the same program are also noteworthy craft according to the published details. Their displacement will be 1,475 tons; speed, 32.5 knots; radius, 3,000 miles at 15 knots; and the armament, four 5-in. guns and four 21.6-in. torpedo-tubes. There seems no doubt that French naval authorities have been much impressed with the merits of the *Amiral Sénès*, which has obviously influenced the design of all their new destroyers.

Italy has not been behindhand in developing torpedo vessels of great speed and artillery power. In certain boats of the *Aquila* class, originally built for the Rumanian Government, but modified when taken over for Italian service, a battery of three 6-in. guns and four 3-in. guns was mounted, with four 18-in. tubes, on a displacement of only 1,556 tons, the speed being 36.5 knots. A larger and more seaworthy design is that of the *Leone* class, now completing, details of which are as follows: Displacement, 2,195 tons, speed, 34 knots; armament, eight 4.7-in. 45-cal., two 3-in. A.A., and six 18-in. tubes. Assuming the 4.7-in. guns to be twin-mounted on the center line, each of these boats will be capable of discharging about eighty 48-lb. shell per minute, a volume of fire which, for a destroyer, would have seemed fabulous not many years ago. Under favorable conditions of sea and visibility they should be able to engage even a small cruiser without undue risk to themselves.

But, in laying down the characteristics of torpedo vessels, regard must be paid to the service on which they are likely to be employed. A type which was eminently suited to Mediterranean service might be ill-adapted for operations in northern waters, and totally unfitted for patrol work on

the ocean routes. It may happen, therefore, that small craft whose fighting value on paper is abnormally high for their tonnage would be unable to work their guns in a seaway, and thus fall victims to an opponent who made better weather of it and could fight his lighter armament with full effect. So far as the British Navy is concerned, it would seem the wisest course to fix a limit for tonnage craft, say, 1,500 tons, and not seek to embody the military attributes of a cruiser in a vessel too small to stand the rough-and-tumble conditions of deep-sea faring. The modern history of British naval construction furnishes numerous examples which ought to serve as a corrective to this tendency. Our latest flotilla leaders are reported to be successful in every respect, but they cost a great deal of money, and are, perhaps, unnecessarily large and powerful. When the time comes to resume such construction we shall be well advised to build many medium boats rather than a few super-destroyers, and not attempt to compete with other navies in the impossible task of pouring a quart of fighting power into a pint measure of displacement.—Hector C. Baywater, in the *Naval and Military Record*, 29 November, 1922.

THE QUESTION OF THE STRAITS.—The question of the Dardenelles has, as Lord Palmerston put it, "been dangling about the council tables of Europe" for a century and a half. It is up again at the council table at Lausanne, and the probabilities are that it will still be dangling about the council tables of Europe, from time to time, for the next few generations unless the Allies make a firm and united stand at Lausanne.

The Dardenelles and the Bosphorus constitute a narrow waterway lying entirely within Turkish territory, and the whole of it is within the three-mile limit, measuring from the Turkish shores. Under these circumstances the Straits might be considered as Turkish territory under the absolute jurisdiction of the Turkish Government. Taking this view of the case, the Turk would have the right to close the Straits and to put up a sign "Keep Out; This Means You!" or, as he is a prohibitionist, he might, according to recent American legal opinions, compel all ships to jettison their wet goods before passing through the Straits from the Ægean to the Black Sea.

On the other hand, these Straits constitute the only passageway between two great seas, and the doctrine of the freedom of the seas holds that, as the seas themselves are free and open, the passageway connecting them should also be free and open. The United States has always maintained this doctrine in regard to the Dardenelles and the Bosphorus. The other great powers entered into various treaties with the Ottoman Empire by which it was agreed that when the Sublime porte is at peace, the Sultan should exclude all warships from the Straits—not only that he could and should do it but that he must do it. The American Government has never been a party to any of these treaties and has consistently refused to be bound by them. The attitude of this Government has been that we don't want to hurt the Sultan's feelings unnecessarily, but that we will send our warships through the Straits any time that we get good and ready.

One of our earliest ventures in those troublous waters was in 1801, when Commodore Bainbridge, in command of the United States ship *George Washington*, arrived at the entrance of the Dardenelles. Feeling doubtful whether he would be granted permission to enter the Straits, he determined to enter first and talk about it afterward. When he arrived at the first "Castle" guarding the entrance he pretended to take in sail as though about to drop anchor and began firing a salute. The "Castle" courteously replied with a salute and, under cover of the smoke, Bainbridge crowded on all sail, passed up the Strait, and was well out of range before the Pasha in command of the "Castle" could bring his guns to bear. The

Sultan gave orders that the Pasha should be promptly executed, but Bainbridge interceded for him and finally everybody was forgiven, making a happy ending to the comedy.

However, we have not made a habit of "running the Straits." We have never had any imperative reason for sending warships through the Straits and, consequently, have refrained from raising the question as to our right of way.

On about half a dozen occasions some of our naval commanders while cruising around in that neighborhood have taken a fancy to visit Constantinople just for the fun of the thing, but the Sultan has always politely declined to permit them to enter the Dardanelles. On one occasion the United States ship *Shenandoah* and a French vessel were hanging so close around the entrance to the Straits that the commander of the Turkish "Castle" apparently got nervous. At any rate, the Pasha loosed off a shot. It didn't hit anything, but its echo was heard in Washington, and our Secretary of State, in response, fired off a dispatch to Constantinople reminding the Sultan of the fact that "the United States are not a party to the convention which professes to exclude vessels of war from the Dardanelles," and are, consequently not bound by that treaty, although "disposed to respect the traditional sensibility of the Porte as to that passage." The Secretary of State further intimated that the Pasha was a rather poor shot, but that some day he might hit somebody, which would "precipitate a discussion, if not a serious complication."

The attitude of the American Government toward the Straits was rather well outlined by our Department of State in 1871 in these words: "The Black Sea, like the Baltic, is a vast expanse of waters which wash the shores not only of Turkish territory, but those of another great power who may, in time of peace, at least, expect visits from men-of-war of friendly states. It seems unfair that any such claim as that of Turkey should be set up as a bar to such an intercourse or that the privilege should in any way be subject to her sufferance."

At the present day there is even stronger reason for insisting on the freedom of the Straits. In 1871 the whole shore line of the Black Sea was occupied by only two nations—Turkey and Russia—but since then other nations have come into existence on the Black Sea and on the rivers tributary to it. The Black Sea is no millpond. Its shore line has an extent of about 2,000 miles (being considerably longer than our whole Atlantic Coast) and into it pour the waters of four of the greatest rivers in Europe—the Danube, the Dnieper, the Don and the Dniester—all of which are longer than the Rhine.

The question of the Straits is no longer a "local issue" in which Turkey and Russia are chiefly concerned. It is a matter of extreme importance to half a dozen other states situated on the Black Sea and its tributaries and also a matter of importance to us and to every country which has intercourse with those states.

If the guardianship of the Straits be restored to the Turk he can "bottle up" the countries of the Black Sea Basin whenever he feels so disposed.

After the Armistice the Allies abandoned their old system and adopted the principle which the United States had always advocated—the principle of the freedom of the Straits. They agreed that the Straits should be open to warships as well as to merchant vessels, both in time of peace and in time of war, and they created a "Zone of the Straits" under the Government of an Interallied Commission. This seems about the best way to handle the situation, but the Nationalist Turks don't like it. They insist that they themselves must govern the Straits, and they promise to guarantee such rights of passage as may be mutually agreed upon. One

great difficulty about that proposition is: Who is going to guarantee the Turks' guarantee? Even if all fortifications were removed from the zone it would be a comparatively easy matter for the Turks to close the Straits by mining or obstructing the narrow channel. The Dardanelles at Chanak are only 1,400 yards wide and the Bosphorus just above Constantinople, is only 550 yards from shore to shore.

Under pressure from United States and the Allies the Turkish delegates at Lausanne have been induced to modify their claim to exclusive jurisdiction over the Straits. Soviet Russia, however, is still doing her best (or worst) to stiffen the Turks' demands—not that she wants her old enemy and present chum to be permanently reinstated as janitor of her south door, but because, when the time is ripe, she will find it easier to take the Straits away from the Turk than it would be to take them away from the League of Nations.

Strong Interallied control at the Straits seems the only wise solution of the matter. The American Government has forcefully reiterated the American principle that the Straits should be open at all times to warships as well as to merchant ships, and if the Allies don't weaken at Lausanne we may hope that the question of the Dardanelles will be definitely settled and cease to "dangle around the council tables of Europe."—James G. Whiteley in the *Baltimore Evening Sun*, 13 December, 1922.

CURRENT NOTES AND PAPERS

"The Olympic Stern Post Repairs."—(Some interesting particulars of the repairs affected, illustrated with photographs).—*The Marine Engineer and Naval Architect*, November, 1922.

"Surveying With Aircraft Photographs"—(Discussion of three of the four steps involved in the making of topographic maps; (1) Establishing control; (2) Gathering surface data; (3) sketching topography; (4) Reproduction of the map.) By James W. Bagley in the *Journal of the Western Society of Engineers*, December, 1922.

NOTES

Pertinent articles in:

Current History for December:

1. "The Ex-Kaiser Scourged: An Analysis of the Memories of William Hohenzollen," by Robert Lansing, ex-secretary of state.
2. "America Again Defenseless," by Lieutenant H. B. Mayer, U. S. A.
3. "The Navy as a Protective Investment," by Admiral R. E. Coontz, U. S. Navy.
4. "The World Tribunal in Action," by R. L. Buell. (The first judicial decisions of the Permanent Court of International Justice—Powers of the Court, etc.)
5. "The United States and Latin America," by Henry Woodhouse. (Steps taken by the U. S. to meet the new conditions created by the World War—Estrangement of three years now being overcome.)
6. "Iraq as Great Britain's Ally." (Full text of treaty, regarded as step toward grant of self-government.)

The Nineteenth Century for November:

1. "Political Strategy: Mesopotamia," by Major-General Sir John Davidson. (A review of the situation in the Middle East, and more particularly the British position in Iraq.)
2. "Reparations: and the Disastrous Balfour Note," by W. T. Layton, Editor of *The Economist*. (A short review of the situation and pointing out that the only hope for Great Britain is "to reverse in fact—however the form be disguised—the policy of the Balfour Note.")

3. "America and Peace," by D. Litt, European Manager of the Foreign Service of the Chicago *Daily News*. (Why it is wrong to speak of America's isolation?")

4. "The Freedom of the Straits," by Major-General Sir George Aston, K. C. B. (Great Britain's obligations under the Treaty of Sèvres, and comparison with the Panama Canal, Suez Canal, Straits of Gibraltar, etc.)

Current articles in *The Nineteenth Century* for December:

"The Vital Eastern Problem: Past Mistakes and Present Dangers," by Major General Sir Herbert Mullaly. (A brief summary of a few of the more salient aspects of the Turkish-British problem from early times.)

"The Admiralty in War: and its Civilian First Lords," by Rear Admiral Sir S. Eardley-Wilmot. (A brief review of certain features of the Great War which seem to indicate that naval administration has certain defects capable of removal.)

NOTES ON INTERNATIONAL AFFAIRS

FROM NOVEMBER 23 TO DECEMBER 23

PREPARED BY

ALLAN WESTCOTT, Professor, U. S. Naval Academy

WORK OF LAUSANNE CONFERENCE

PROBLEMS CONSIDERED.—The chief problems in the Near Eastern settlement taken up at Lausanne were as follows: (1) the control of the Straits; (2) the protection of Christian minorities in Turkey, involving the Turkish claim to western Thrace and the expulsion of Greeks from Constantinople and elsewhere; (3) the question of trading privileges and in particular the control of the Mosul oil fields in the northern part of the British mandate of Iraq or Mesopotamia. Russian delegates were allowed to take part only in the discussion of control of the Straits.

TRADING PRIVILEGES.—On November 25 Ambassador Child stated that the position of the United States in the Turkish question was for the "open door" and opposed to any settlement, private treaty, or bargain, which should give to one nation or group of nations special privileges in the exploitation of Turkish trade or resources. England two days later declared her acceptance and support of this principle.

This declaration had a special bearing on the disputed Mosul oil region near the boundary between Iraq and Turkey. In a later statement, Great Britain made it clear that she did not surrender her special claims to concessions in this region granted prior to the war and accepted by France and Italy in the agreement at San Remo.

FREEDOM OF THE STRAITS.—The original Turkish proposal, strongly backed by Russia, was that the Straits should be opened to commerce, closed to war vessels in peace or war, and fortified by the Turks as in the past. Turkey, however, at once showed willingness to compromise with the Allies' demand for demilitarization of the Straits and free passage for naval vessels, as well as merchant craft, in both peace and war. The United States representatives favored complete freedom of the Straits, but in a note presented by Ambassador Child stated their preference for supervision by Turkey rather than an international commission created by the League of Nations. This view was disregarded, and upon the insistence of the Western powers the Turkish delegates on December 21 signified acceptance of the following plan (in summary):

A. *Freedom of Straits*

- I. *To all merchant vessels* and civilian airships, complete in time of peace, and complete also in time of war, except that if Turkey is a belligerent she may enforce her rights under international law to stop enemy and contraband trade.
- II. *To all war vessels* and military airships, complete in time of peace by day and night, with the limitation that no power can send through the Straits a fleet stronger than the strongest fleet of the Black Sea States at the time.

In time of war, with Turkey neutral, complete freedom, with the same limitation as in the preceding paragraph. (While this would seem to limit the size of the entering fleet to that of the strongest of the Black Sea powers, it is further provided, somewhat obscurely, that "These limitations will not be applicable to a belligerent power to the detriment of its belligerent rights in the Black Sea.")

With Turkey a belligerent, the privilege to Turkey of fortifying the Straits to prevent the passage of enemy ships, provided this does not interfere with the passage of neutral war vessels.

B. *Demilitarized Zones*

- I. All the waters from the Mediterranean to the Black Sea; all the Gallipoli peninsula, and a strip twenty kilometers deep on the Asiatic side of the Dardanelles; all the islands in Marmora; on the Bosphorus, strips fifteen kilometers deep on both shores; the islands of Samothrace, Lemnos, Imbros, Teneados, and Rabbit in the Ægean.

Turkey to have freedom to pass armed forces through the demilitarized zones, to use the Straits for her fleet and for a naval base, to have a garrison of 12,000 in Constantinople.

Turkey to be free to fortify the Straits in time of war.

- C. The Straits Commission will consist of representatives of Turkey, England, France, Italy, Japan, Russia, Rumania, Greece, Bulgaria, Jugoslavia and also the United States if she chooses, with the Turkish representative as president.

PROTECTION OF MINORITIES.—The Turkish proposal of a plebiscite in Western Thrace was rejected. Turkey subsequently showed willingness to accept the Allied solution providing for a twenty kilometer demilitarized zone between Eastern and Western Thrace along the Maritza River, with an exit to the Ægean for Bulgaria via the railway through this zone to the port of Dedeagatch. Both Lord Curzon and Ambassador Child made strong statements insisting upon the protection of Christian minorities in Turkey. On December 14 Ismet Pasha agreed that Turkey would join the League of Nations and that the Christian minorities in Turkey should be protected by the same guarantees that were provided by the League for minorities in countries of Central Europe. This indeed was the original

Turkish position, in opposition to special surveillance by a League Commission in Constantinople.

GREEK LEADERS PUT TO DEATH.—On November 28, by order of a Greek military tribunal, former Premier Gounaris and five of his Cabinet, together with the former head of the army in Asia Minor, were put to death. Two other generals were sentenced to penal servitude for life. The charges against the cabinet members were that they had by violent means stifled public opinion, concealed the danger arising from Constantine's restoration in order to maintain themselves in power, and by their pretended offensive against Constantinople, fatally weakened the forces in Asia Minor. Prince Andrew, brother of Constantine, escaped punishment by the defense that as a general he was a figurehead without real responsibility.

Efforts were made by the diplomatic corps in Athens to prevent the executions. The British and other governments immediately afterward broke off diplomatic relations with the Greek government.

REPARATIONS AND ALLIED DEBTS

DECISION POSTPONED AT LONDON.—A meeting of the French, British, and Italian premiers was held in London on December 10-11. Revised German proposals for a reparations settlement presented by Chancellor Cuno was declared unsatisfactory and a reply was sent to that effect. In fact the German proposals merely asked for at least a two-year moratorium and stabilization of the mark by foreign and internal loans.

In view of the plainly stated disapproval of both Great Britain and Italy, Premier Poincaré was led to postpone his proposed occupation of the Ruhr region as a protective guarantee. Premier Bonar Law set the Balfour note aside and indicated in general terms his willingness to consider cancellation of the French debt to England provided this would lead to a settlement of the whole reparations question satisfactory to England.

The proposed Brussels Financial Conference was called off and a general conference was set for January 2 in Paris, to reach definite decisions before January 15.

REPARATIONS SETTLEMENT BEFORE LOAN.—The return of Ambassador Harvey for consultation in Washington, and statements from official sources in Washington led to a general belief that the American government was about to take an active part in the reparations settlement. During a trip to Washington in December, Mr. J. Pierpont Morgan was consulted by the German Ambassador regarding the possibility of a foreign loan to Germany.

On December 18 the J. P. Morgan Company announced that their attitude regarding a German loan was the same as last summer, that is, that no such loan could be considered "unless and until the reparations question was settled." The United States government on the same date made a similar announcement.

GREAT BRITAIN AND IRELAND

IRISH FREE STATE ESTABLISHED.—On December 5 the Irish Free State Constitution Bills passed the House of Lords, received the royal assent, and became the law of the land. Timothy Healy, an Irish lawyer and politician, associated from Parnell's time with the movement for Irish separation, was appointed Governor General. On December 12 the Irish Senate and Assembly met in joint session to hear the King's message and the Governor General's opening address.

During December the Free State took more drastic measures against republican insurgents. After the murder of Brigadier General Hales on December 8, the Government on the following day put to death four irregular leaders who had been in prison since the capture of the Four Courts last July.

RUSSIA AND NORTH EUROPE

FAILURE OF DISARMAMENT CONFERENCE.—A conference on limitation of armaments met in Moscow on December 2 with representatives of Finland, Esthonia, Latvia, Lithuania and Poland. Rumania refused to attend unless Russia recognized Rumanian annexation of Bessarabia. The armies of the six smaller states were estimated at about 505,000; that of Russia at somewhat less than 1,500,000, with a field army of about 800,000. Russia proposed to cut this to 200,000, or seventy-five per cent, if the other states would make corresponding reductions. This the smaller powers refused to do without guarantees against attack. Hence the conference ended without results, though Russia is likely to make reductions in any case owing to the cost of feeding troops.

POLISH PRESIDENT ASSASSINATED.—On December 16, one week after his election, President Gabriel Narutowitz of Poland was shot and killed by an insane artist. Narutowitz, a relative of General Pilsudski, was elected by a small margin of votes supplied by alien minority parties in Parliament. He was opposed by the Nationalists. In subsequent elections held on December 20, Stanislas Wojcieszowski, a moderate of the Farmers' Party, was chosen to fill the vacant presidency.

RATIFICATION OF NAVAL TREATIES

FRANCE CHAMBER DELAYS RATIFICATION.—Paris, Dec. 14.—A renewal of the Government's promise that the Washington Naval Treaties would shortly be brought before the Chamber for debate, was made today by the Minister of Marine during a discussion of the naval estimates for the next year.

The discussion will not come before January at the earliest, and then only if the commissions are finished with their work.

M. Briand, however, had a word to say in favor of discussion of the naval accord as soon as possible. At Washington, he said, the naval problem had been studied from two points of view, offensive and defensive. So far as the offensive was concerned France had shown herself willing to concede every demand. If there had been a fluctuation of opinion it was

because it was wished by some to bind France to a proposition between offensive and defensive tonnage. On that point, he continued, France did not wish to give way.

"We have pointed out the world situation," he said, "and shown that if we have no doubts about the intentions of our friends and allies, the state of the whole world is not quite so reassuring. The possibility of our adversaries constructing large numbers of light ships and the extent of our coasts are for us very imperious reasons for not limiting construction of a defensive nature, as our national sovereignty is at stake. Our English, American and Japanese friends have since taken this into account and the polemics of a year ago are now forgotten."

The Minister of Marine, thanking Mr. Briand for his intervention, declared his view was that of the Government.

Coming the day after publication of the report of the Appropriations Committee, the House of Representatives debate shows exactly how France will regard a proposed new conference at Washington to limit auxiliary naval construction, on which no limit was placed last year. The French argument will be that the whole program of light cruisers and submarines now being budgeted for within the financial possibility for construction in France in the next ten years are simply defensive weapons.—15 December, *New York Times*.

FAR EAST

CHINA TAKES OVER SHANTUNG.—On December 10 Japan evacuated Kiao-chau and turned over the civil and military administration to the Chinese government. The final arrangement was that China should pay Japan forty million yen for the Shantung Railway in fifteen-year Chinese Treasury notes at six per cent, and sixteen million yen for public property in Kiao-chau. At the time of the evacuation, Chinese bandits in the Shantung region threatened to take possession of the city of Tsing-tau.

In the meantime the Chinese government at Peking has weakened and swung back into the hands of the military leaders. Premier Wang Chung-tau and Foreign Minister Wellington Koo were impeached after scandals connected with a loan from the Sino-Italian Bank, and on December 19 General Chang Shao-tseng became premier with the support of General Tsao Kun and other militarist elements in Peking.

LATIN AMERICA

CENTRAL AMERICAN CONFERENCE.—The Conference of Central American States meeting in Washington, voted on December 18 to postpone for a year the question of political union, leaving the matter to be studied and reported upon by a sub-committee. The conference then adjourned pending the completion of a report by the sub-committee on plans for a tribunal to settle disputes among the powers concerned.

REVIEW OF BOOKS

PRACTICAL ADVANCED NAVIGATION, by Charles H. Cugle. (Published by E. P. Dutton and Company. Price \$3.00). A Review by Commander John Downes, U. S. N., Head of Department of Navigation, U. S. Naval Academy.

For "rule of thumb" navigation this work appears to be what is required. As the author announces, no effort has been made to delve into theory, but rules have been laid down in simple language which if followed implicitly would lead the average sailorman to his destination. Examples are given of every practical kind of deep sea navigation. No effort has been made to follow out the correctness of the problems presented, though it is noted in Example 1, page 2, that the author himself did not follow his own rule: viz., Use the *supplement* of the hour angle when the latitude and declination are of different names. In the chartlets no effort has been made to apply current. For instance in the chartlet covering Problem 1, Marcq St. Hilaire Method, page 47, the current (the term current being used to represent the combined effect of wind, sea, actual current, bad steering, foul bottom, etc.), obtained as represented by the altitude differenced at time of first sight, should be applied proportionately to the D. R. position for second sight. This would result in a very much smaller altitude difference for the second sight and give the rule of thumb navigator more confidence in his work.

In the chartlets covering two simultaneous observations the author unfortunately picked out two stars whose azimuths were too nearly opposite, giving too acute an angle to the plotted lines relative to each other. It should be explained in the text that it is desirable to use two bodies whose azimuths or the reverse of either one differ by at least sixty degrees. When the angle is less than this, error in position is greatly increased through small error in altitude differences.

The book should prove very useful to the merchant sailor or yachtsman who does not care, or has not the time, to delve into the theory of advanced navigation. There are numerous good books already available from which the theory may be obtained.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Membership Life, regular and associate, 4766; new members, 42; resignations, 127; deaths, 1.

Practically the whole service receives the benefit of the PROCEEDINGS, yet many officers who read it monthly are not members, and therefore contribute nothing to the support of the Institute.

The publication of the PROCEEDINGS involves a monthly deficit that is a tax on the resources of the Association. As this deficit can best be overcome by an increase in the membership roll, the loss of 369 members during the last year is a serious matter. However, the gradual decrease in membership during the last few years may be looked upon as an aftermath of the war. Earnest effort is being made to counteract this, and there are encouraging signs that soon the tide will turn the other way. If the Service will give the Institute a little more support, it will not be necessary either to curtail the PROCEEDINGS or to increase the yearly dues. *Members are requested to urge non-members to join, and send subscriptions for the PROCEEDINGS to their friends outside the Service. These may begin with any month desired.*

Dues The annual dues (\$3.00) for the year 1923 are now due. *Regular and associate members* of the U. S. Naval Institute are subject to the payment of the annual dues *until the date of the receipt of resignation*. Subscriptions by or for *non-members* are \$3.50 per year; these are *automatically discontinued at expiration*. (Foreign postage 50 cents extra in all cases.)

Discussions Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at one-half the rate for original articles, or about \$2.25 a page.

Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication.

Book Reviews As soon as practicable after the publication of books on subjects of professional interest, the Institute aims to publish authoritative reviews of them.

Book Department *The Institute Book Department will supply any obtainable naval, professional, or scientific book at retail price, postage prepaid.* The trouble saved the purchaser through having one source of supply for all books should be considered. The cost will not be greater and sometimes less than when obtained direct from dealers.

Address orders to: U. S. Naval Institute, Annapolis, Maryland.

Address of Members To insure the delivery of the PROCEEDINGS and other communications from the U. S. Naval Institute, it is essential that members and subscribers *notify the Secretary and Treasurer of every change of address without delay.*

Reprints of Articles Twenty copies of reprints are furnished authors free of charge. Additional copies to the number desired will be furnished at author's expense, provided request is made before going to press.

Special Notices See also following pages for extracts from the constitution, notice regarding prize articles, and suggested topics.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its fiftieth year of existence. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers upon subjects of interest to the naval profession, as well as by personal support.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of life, regular, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy, subsequent to joining the Institute, will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nomination shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be three dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

Sec. 10. Members in arrears more than three years may, at the discretion of the Board of Control, be dropped for non-payment of dues. Membership continues until a member has been dismissed, dropped, or his resignation in writing has been received.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly. Subscription for non-members, \$3.50; enlisted men, U. S. Navy, \$3.00. Single copies, by purchase, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE, 1924

A prize of two hundred dollars, with a gold medal and a life membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original article on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the article.

On the following pages are given suggested topics. Articles are not limited to these topics and no additional weight will be given an article in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original articles published in the PROCEEDINGS during 1923 shall be eligible for consideration for the prize.

2. No article received after October 1 will be available for publication in 1923. Articles received subsequent to October 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best article published during 1923 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more articles receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. The method adopted by the Board of Control in selecting the Prize Essay is as follows:

(a) Prior to the January meeting of the Board of Control each member will submit to the Secretary and Treasurer a list of the articles published during the year which, in the opinion of that member, are worthy of consideration for prize. From this a summarized list will be prepared giving titles, names of authors, and a number of original lists on which each article appeared.

(b) At the January meeting of the Board of Control this summary will, by discussion, be narrowed down to a second list of not more than ten articles.

(c) Prior to the February meeting of the Board of Control, each member will submit his choice of five articles from the list of ten. These will be summarized as before.

(d) At the February meeting of the Board of Control this final summary will be considered. The Board will then decide by vote which articles shall finally be considered for prize and shall then proceed to determine the relative order of merit.

6. It is requested that all articles submitted be typewritten and in duplicate; articles submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

H. G. S. WALLACE,

Commander, U. S. Navy, Secretary and Treasurer.

SUGGESTED TOPICS FOR ARTICLES

Aviation—Its Present Status and Probable Influence on Strategy and Tactics.
The Anti-Aircraft Problem from the Navy's Viewpoint.
Co-ordination of the Naval Air Force with Other Naval Forces.
Naval Bases, Their Number, Location, and Equipment.
Military Character.
The Relation of Naval Communication to Naval Strategy.
Proportion of National Budget Which Should be Devoted to Naval Expenditures.
The Necessity for Having a Fleet.
Organization of Fleet for War.
The Offensive and Defensive in Gas Warfare.
The Best Protection from Gas Attack.
Naval Gunnery of Today, the Problems of Long Range and Indirect Fire
Physical Factors in Efficiency.
The Relation between the Navy and the Merchant Marine.
America as a Maritime Nation.
Relation of the Medical Department to a Plans Division.
The Place of Mines in Future Naval Warfare.
A Mobilization Program for the Future.
Morale Building.
The Mission of the Naval Academy in the Molding of Character.
How to Best Educate and Convert the American People to the Need of a Strong National Defense.
The Navy in Battle; Operations of Air, Surface, and Underwater Craft
Navy Spirit—Its Value to the Service and to the Country.
Based on a Major Ship Strength of Eighteen Dreadnoughts, What Do You Consider a Balanced Navy?
The Future of the Naval Officers' Profession.
The Naval Officer as a Diplomat.
Is the Present System of Training and Education for Officers Satisfactory and Sufficient?
The Role of the Navy at Peace.
Training Naval Personnel During the Next Ten Years.
Six Years of Promotion by Selection in U. S. Navy. Its Effect Upon Discipline and Morale.
The Employment of Retired Officers Separated from the Service by Reason of the Age in Grade Feature of the Existing Selection Law.
What Measures Should be Adopted to Create and Maintain a Balanced Enlisted Personnel of 120,000 Men?
Our Future Naval Policy Based on Existing International Treaties.
The Future Naval Continental Shore Establishments.
Shore Duty for Enlisted Men.
The Limits of Specialization in Naval Training.
The Effect of the 5-5-3 Ratio Upon U. S. Naval Strategy in the Eastern Pacific.
Armor or High Speed for Large Surface Vessels?
Airplanes and Submarines Versus Super-Dreadnoughts.
The Navy's Relation to the Nation in World Affairs.

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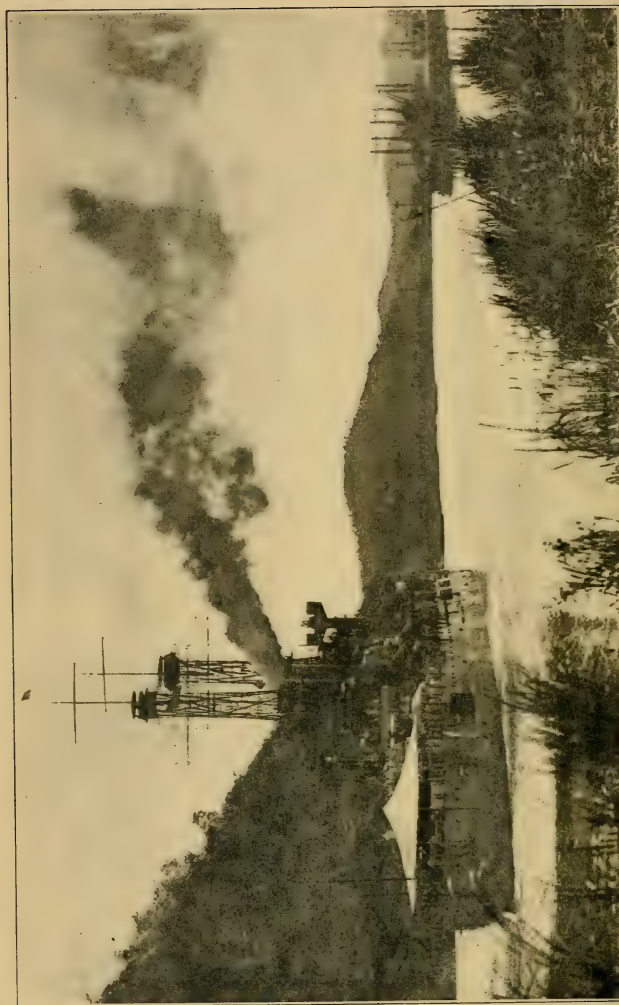


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U. S. S. "UTAH" IN THE PANAMA CANAL
Nearing the Pedro Miguel Locks

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DESTROYER EXPERIENCES DURING THE GREAT WAR

BY CAPTAIN J. K. TAUSSIG, U. S. NAVY

IV. OPERATING FROM THE BASE AT BREST

Wherein is told of the fitting out of the first of the new destroyers, their duties prior to arrival at Brest, and what they found there. Also some experiences attendant on the escorting of troop ships through the submarine danger zone.

FITTING OUT A NEW DESTROYER

For one who went through the trials and tribulations of placing a new destroyer in commission during the war, no narrative of destroyer experiences would be complete without at least a brief reference to this duty.

The difficulties the Bureau of Navigation had in furnishing trained men for these vessels, and how the plan was adopted for sending nucleus crews from Queenstown, has already been told. The first three of these nucleus crews of twenty-five men each arrived in the United States about December 1, 1917. With them came Commander A. W. Johnson, Commander W. N. Vernou, and myself. We were ordered to report to the Inspector of Machinery at the Fore River Shipbuilding Company, Quincy, Mass., for duty in connection with the *Kimberly*, *Sigourney*, and *Little*, respectively. The crews for these vessels were to be assembled at the Receiving Ship, Boston.

It was announced that these destroyers would be commissioned early in January, 1918, but owing to various delays, the first of them, the *Little*, was not turned over to the Government until April 6, 1918. She was placed in commission, under my command, the same day, exactly one year after the United States declared war. Following the *Little*, other destroyers were commissioned with creditable rapidity. But we have no reason for being boastful about these first destroyers. Congress authorized their construction in August, 1916; so it was a year and seven months before the first of them was completed,—certainly not an accomplishment over which the country has a right to feel proud.

During the delay attendant upon getting the destroyers in material readiness, the assembling and organizing of the crews went on at Commonwealth Pier. Here were thousands of men to choose and pick from. But few there were who had ever been to sea. Any man who had the least knowledge of salt water was immediately picked by the first executive officer who happened to make the discovery. Here and there would be found an ex-service man, or one who had gone down to the sea in merchant ships. Now and then, through dire necessity, a prison "graduate" would be chosen, so great an asset was seagoing experience considered. These stray men, together with the twenty-five trained men from Queenstown, and from sixty to seventy-five recruits, would gradually be welded into a destroyer crew. The Pier, in fact, was a veritable training station where rudiments of discipline and the meaning of orders were taught. Unfortunately there was no battery of guns at which the men could be drilled. An earnest attempt was made to have a 4-inch gun installed on the Pier, but two months of effort proved unsuccessful. There was no gun available for this important use.

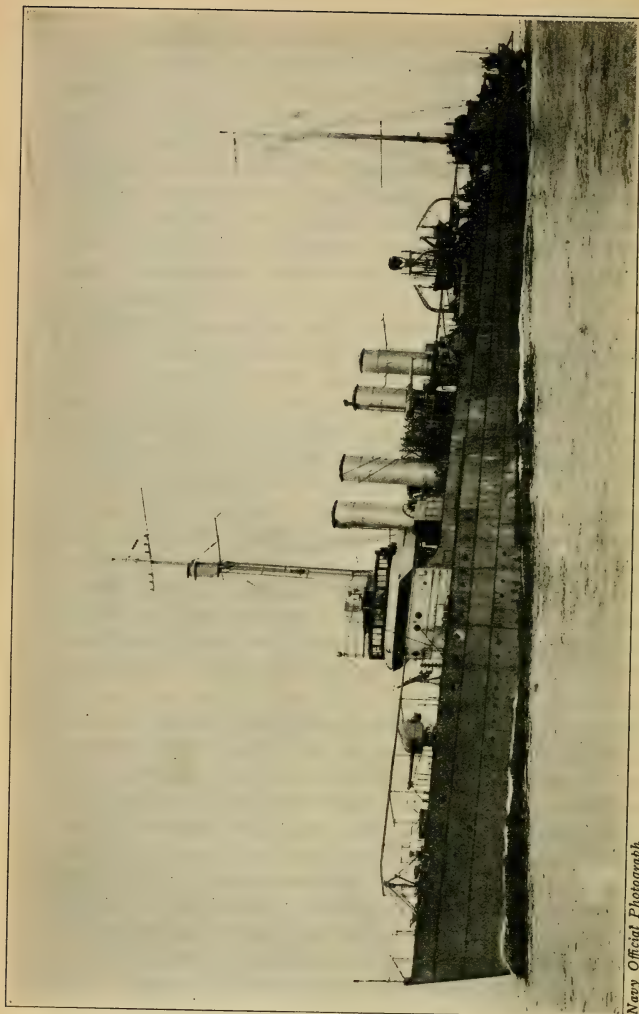
While it is understood that the material condition of the later destroyers was much better than these first ones, a brief account of some of the *Little's* troubles will be a fair sample of the others. The workmanship throughout was poor. Rivets were carelessly driven, thereby leaving many leaks through the deck and hull plating. In most cases these leaks were a source of either worry or discomfiture. They did not necessarily interfere with temporary military efficiency; but there were times when they did. An instance of this was where the skin of the ship served as one

side of the lubricating oil tank. Owing to leaks through rivets and seams it was impossible to keep the oil free from salt water.

For lack of supervision, or other reasons, the piping systems throughout the ship contained much dirt and foreign matter. This manifested itself in many ways, especially during the first two months after commissioning. The *Little* was to have run the steaming trials for the whole class. She never accomplished this, mainly due to hot bearings, especially the Kingsbury thrusts which burned out at the higher speeds. The reason for these bearings running hot was ascribed to various causes; but it would seem that the main source of trouble was dirt throughout the system. After being in service for two months we had collected from the steam and water pipes over a bushel basket of nuts, bolts, etc. They had a way of making themselves known by jamming the valves. There was no great harm done, as a rule, but on one occasion when making a landing in the crowded harbor at Brest, two bolts jammed one of the backing throttles open. We barely missed serious collision due to delay in getting the ship stopped.

The boilers of the *Little* were built in a hurry. In order to save time the experiment was tried of rolling in the tubes cold, without first annealing the ends. As should have been expected, numerous leaks developed, which required extensive work before the boilers were tight. The final cost was undoubtedly more than if the boilers had been built right in the first place; and no time was saved in the long run.

Many other examples of poor workmanship could be cited. In fact, with the great expansion of this particular shipyard, which necessarily meant a lowering in the average quality of the labor employed, it was to be expected that a certain amount of poor workmanship would be found. This feature we commanding officers could understand. But what was beyond our ken was the disinclination of some in authority (both within the service and without) to pay heed to our requests for slight changes and alterations which war experience had shown to be desirable, and for which reason we understood the Department had ordered us to duty in connection with these vessels. My most disagreeable destroyer experiences of the war were due to this.



Navy Official Photograph

U. S. S. "Burns"

One of the new 1200-ton destroyers completed during the war. Note the fighting lights on the signal yard arm; the covered crow's nest; the built-in bridge; spray shield on fore-castle gun. These improvements were the result of war-time experiences.

On account of the poor material condition and the inexperienced personnel, official recommendation was made to the Department that immediately on commissioning we proceed to Guantanamo Bay for a ten-day shakedown, and then go direct to one of the European Bases. Neither the Department nor Admiral Sims approved of this procedure, both, however, for different reasons.

Admiral Sims in a personal letter to me, wrote:

As for your proposition to have a ten-day shakedown cruise in the South, I am sorry to say I do not agree with it at all. Of course I understand that this would be very desirable for many reasons and that if you could do it you would arrive on this side in a more efficient condition. But the essential thing is to get the destroyers over to this side at the *earliest practicable moment*. As you very well know the question of gunfire on destroyers can never cut very much ice in opposition to the submarine, for the simple reason that there are very few opportunities to use the guns with efficiency. The principal thing now is numbers, numbers, numbers, but these numbers will be no good unless they arrive here in time. The situation is really very critical. We are hard up against it for a sufficient number of vessels to supply adequate escort for the merchant convoys. We also almost entirely lack a sufficient number of vessels, to carry out the hunting operations against the submarines that we hope to carry out as soon as possible. Therefore you fellows should use *every possible effort* to get your vessels away from the yard and to start over here, training or no training. I understand that you can do very little on the way. The important thing is the presence of the vessel on this side.

This letter was dated February 26, 1918, more than ten months after we entered the war. As my ship was not in commission when it was received, I immediately wrote officially to the Navy Department withdrawing the recommendation for a ten-day shakedown at Guantanamo, and requested to be ordered to one of the European Bases immediately on commissioning.

In answer to this last request the following reply was received:

NAVY DEPARTMENT
OFFICE OF NAVAL OPERATIONS
WASHINGTON

March 25, 1918.

From: Chief of Naval Operations.
To: Commander J. K. TAUSSIG, Fore River Shipbuilding Company, Quincy, Mass.
Subject: Movements of U. S. S. *Little* after commissioning.
Reference: (a) Your letter of 23 March, 1918.

1. The receipt of reference (a) is acknowledged.
2. The present policy of the Navy Department is to maintain on this

coast, distributed in the First, Third, and Fifth Districts, respectively, a few destroyers for operation against enemy submarines, should they appear in these waters. In carrying out this policy, the Department has decided to use for the purpose new destroyers during their fitting out and shaking down periods, sending them to European Waters when their places have been taken by newer destroyers coming along.

3. Accordingly, when the *Little* has been commissioned, she will be assigned to a district, probably the First District, for temporary duty during the period necessary for conducting her trials and for shaking down.

4. Inform the Department when it is expected the *Little* will be commissioned.

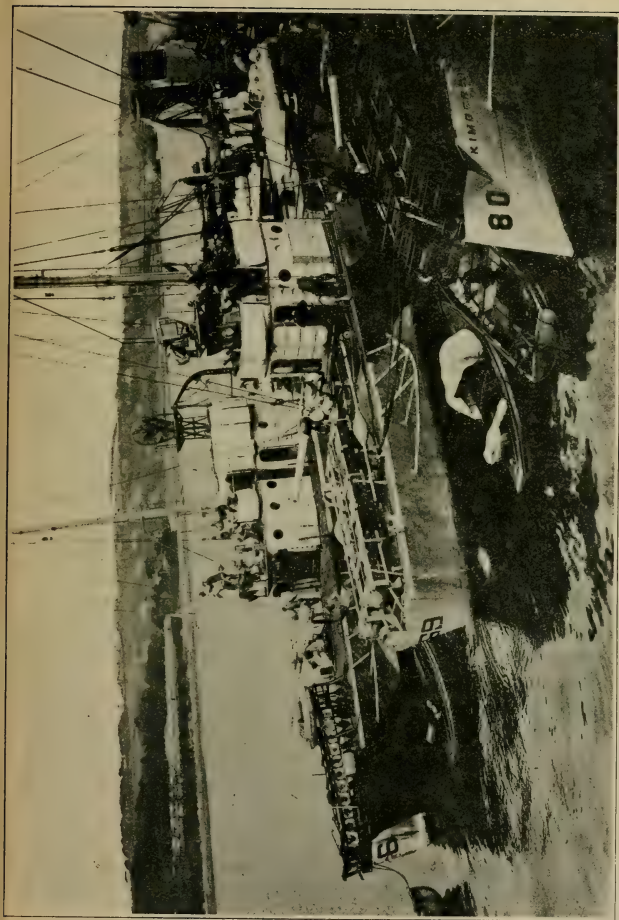
W. S. BENSON.

It will be seen from this that the German's announced intention to send submarines to our Atlantic Coast was already serving its purpose, although as yet no submarines had appeared. The German plan was to have one or two submarines operate against shipping three thousand miles from their base, although it was well known to them that the opportunities for inflicting damage were not nearly so good as off the English Channel, which was the funnel through which most of the shipping passed enroute to Europe. They felt that by diverting these few submarines, the United States would, as a counter-measure, divert a number of destroyers from the more active fields of operation and thereby, give the large number of submarines operating therein a better opportunity for destroying merchant vessels.

In accordance with the Department's stated policy, the *Little* when commissioned on April 6, 1918, was assigned to the First Naval District. We remained on this detail nearly six weeks, our headquarters being at Boston. There being no submarine scare on the Atlantic Coast during this period we were not sent on patrol, but put in our time drilling and training and remedying as far as possible the numerous defects with which we were commissioned and which continued to make themselves evident. Considerable time was spent in certain engineering tests which were prescribed by the Department, but there was no opportunity for target practice with guns or torpedoes.

On May 15, the following radio was received:

Commandant of First Naval District from Chief of Naval Operations. U. S. S. *Little* and U. S. S. *Kimberly* hereby detached temporary duty First Naval District period Commandant First Naval District direct these



Stern view of the *Sampson*, *Caldwell* and *Kimberly* showing depth charges in racks.
Note the Y-gun and splinter mattresses on the after deckhouse of the *Sampson*.

vessels when in all respects ready for distant service proceed to Hampton Roads and report Commanding Officer U. S. S. *Huntington* not later midnight seventeen May for escort duty with *Huntington*, due to sail eighteen May period *Kimberly* and *Little* proceed with *Huntington* convoy as far as fuel will permit with enough remaining on board to reach Ponta Delgada and report senior United States Naval Officer present period Acknowledge.

In accordance with these instructions the *Little* proceeded from Boston to Hampton Roads arriving at that place early in the morning of the seventeenth. The *Huntington* was in port, and Captain J. K. Robison, without waiting for the formality of a call from me, came alongside the *Little* in his motor gig, rustled me into it, and took me to Newport News, where a conference of troop ship commanders was held on the *President Grant*. Here the operation order was discussed, details as to procedure settled, and the conference adjourned.

The transference of the *Little* from a base at Boston to service overseas came suddenly, so it was necessary to proceed to the Norfolk Navy Yard for fuel and a few supplies. The next morning, the eighteenth, we joined the convoy of seven large troop ships (two of them Italian) outside the Capes. The fog set in thick before the convoy was formed up. Earlier in the year this would not have made so much difference, and the ships would have been directed to proceed individually and meet at a rendezvous one or two days out. But word had been received that a German submarine was enroute to our coast, so it was desired to have the convoy under escort. This convoy, the last one to leave the United States prior to the arrival of the expected submarine, struggled through the fog, temporarily lost one or two of its members, but eventually shook itself clear and was off. The *Kimberly* was delayed, owing to defects which necessitated her docking at Boston, but she joined company with us two days out at sea.

These new destroyers with their flush decks were fine sea boats, and the later ones were improvements in nearly every way over the old type. They contained a number of improvements which our war experience had shown necessary or desirable. These were, briefly summarized: Proper crow's nests for lookout and fire-control; fighting lights; built-in bridge; spray and wind shield on forecastle gun; cocoa matting on deck to

insure safe footing; ready ammunition racks; Carley life rafts; depth charge racks; depth charge Y-gun, radio compass, and listening-devices. However, Captain Johnson and I found ourselves in command of ships that did not nearly have the steaming radius of our previous commands, the *Conyngham* and *Wadsworth*. In fact not only were these new destroyers less economical, but they also carried less fuel than the older boats! It was for this reason that the Department had directed us to put in at Ponta Delgada. We separated from the convoy and arrived at that port on May 26.

On reporting to Rear Admiral H. A. Dunn, who was in command of the Azores Detachment of the United States Forces Operating in European Waters, we learned that these two ships and the *Conner*, Commander A. G. Howe, which had preceded us, would probably be based at the Azores indefinitely. We had thought, of course, that we would go right on to Queenstown as soon as refueled; but here again the Germans had succeeded in dividing our forces, by the simple means of sending a submarine to show itself in the vicinity of these islands.

Ponta Delgada at this time was a busy place. It was a fueling port for ships that could not make the trip across in one leg. Although repair facilities were limited, broken down ships made this place a harbor of refuge. The *Cheyenne* and a division of submarines were based here; there was a sea-plane patrol; and the Gunboat *Machias* was at hand for an emergency call. A battery of 7-inch guns in charge of a detachment of Marines had been installed on shore, as a precautionary measure against any enemy submarine that again might attempt to bombard the city. Submarine chasers enroute to the Mediterranean made this a port of call. The *Little* had the experience of escorting nine of these, three French and six American, to Gibraltar.

But insofar as submarine activity was concerned, Ponta Delgada was a dull place for destroyers. So when orders came for the *Kimberly* to proceed to Queenstown, and for the *Conner* and *Little* to proceed to Brest, we were glad to move on. We felt that our services were much more needed in those waters, and it was time our fitting out details should come to an end.

AT BREST

Until May, 1918, the main bases for the destroyers engaged in escort duty were at Queenstown and at Plymouth. The United States destroyers operated from the former port, and the British destroyers from the latter. Considerable of the duty of these destroyers consisted in escorting troop ships and store ships into and out of Brest and other French ports. Brest was being gradually developed as the main port of debarkation for those United States troops that were convoyed in United States ships. These inbound troop ships were escorted by the Queenstown destroyers. When outbound, these same troop ships were, after the troops had been debarked, escorted by vessels of the Brest command. These consisted mostly of the older coal burning destroyers and converted yachts. The policy was that incoming loaded vessels should have the strongest escorts available, while the outgoing vessels, traveling light, should receive such protection as could be given without detracting from the others.

Until April, 1918, the troop movement was not of sufficient magnitude to keep many destroyers fully occupied. Therefore, the Queenstown force could, when the occasions occurred, send a detachment to meet each convoy as due. This, of course, had its disadvantages, in that the destroyers, after seeing the troop ships safely into Brest, had to return light to Queenstown, a distance of about two hundred fifty miles. As the troop convoys became more and more frequent, the disadvantages of this method of operation, which had long been recognized, became more and more apparent.

The main difficulty with establishing a destroyer base at Brest was in the lack of fuel oil facilities at that place. With the limited number of destroyers available it had been, therefore, much better to keep them concentrated at Queenstown, where they were ready for both the troop convoys and merchant convoys.

However, the time was approaching when the troop convoys became frequent enough to demand the full time of a large number of destroyers. This time arrived in May, 1918, simultaneously with the availability of a number of new destroyers. The logical step was then taken of dividing the Queenstown force by sending some to Brest where they were permanently based under the com-

mand of Rear Admiral H. B. Wilson, U. S. N., who commanded the United States Naval Forces in France.

The *Little* arrived at Brest on June 9, 1918. We found here the methods of administration and control somewhat different from that at Queenstown, due to the fact that at Brest there was a dual control, while at Queenstown there was unity of command.

A number of destroyers had suddenly been sent to Brest where they augmented the forces operating from that base. Here they had to be organized, administered and commanded under conditions that were complex. There were no destroyer tenders at Brest other than the *Panther*, which was kept busy with the coal burners. The *Prometheus* was the repair ship for all other craft, and she had her hands more than full.

Owing to these conditions the relationship between destroyers, *Prometheus*, District Commander and French authorities was not at first clear. There was some difficulty in promptly obtaining our fuel, stores, provisions, and repairs, as each commanding officer had to go to several different sources in order to get these logistic requirements fulfilled. However, after the arrival of the *Bridgeport* for duty as destroyer tender, most of our difficulties adjusted themselves, and others gradually disappeared as time permitted of better organization and co-operation.

For many officers the chief point of rendezvous when ashore at Brest was in the apartment of Madame Grout, the wife of Rear Admiral Grout of the French Navy, who was in command of the French Cruiser *Force*, operating on the United States side of the Atlantic. This estimable lady and her daughter, Mlle. Germaine (who has since married one of our American Naval Officers), were most charming hostesses. No matter at what time we dropped in, they were ready to entertain us; and ten o'clock in the evening was a favorite time for serving tea. Madame Grout, like everybody else in Brest, was without sugar and white flour, so we from the destroyers would make donations of these important ingredients, in return for which we were served the most delicious chocolate cake and other pastries with our tea. Madame Grout and her family will always carry with them the well wishes of those of us who were fortunate enough to have crossed their path.

OPERATING WITH TROOP SHIPS

Although our duties while *inside* the harbor at Brest were not so satisfactory as we would have liked, we certainly had no reason for complaint as to the *outside* work, which was carried on under the orders of Admiral Wilson. In fact there was considerable more thrill and satisfaction, and much less monotony, in working with the troop ships, than with the store ships. While we knew that the merchant convoys were glad to see the destroyers heave in sight, they gave us no outward sign of enthusiasm. On the other hand, when we met a troop convoy, the whole atmosphere seemed to be surcharged with joy, emanating from the thousands of men on the ships. It was good to know that they were glad to see us.

The troop convoys were smaller in number of units, but often greater in displacement, than were the merchant convoys. But instead of crawling along monotonously at an advance of seven to ten knots, these troop convoys sped along at from thirteen to twenty knots. If we happened to be detailed for escort duty with the fast ships, such as the *Agamemnon*, *Von Steuben*, and *Mount Vernon*, and then met an inbound convoy composed of the *Great Northern* and *Northern Pacific*, or the *Leviathan*, our total time at sea would be only three days. In fact, while operating with these troop convoys, our longest periods at sea were five days. On the other hand, when escorting store ships from Queenstown as a base, six days was the usual sea period, and at times we were out for seven, or even eight days. But these fast trips often brought with them much discomfort. Especially was this so when standing out to the westward, bucking the ever present westerly wind and sea that prevails in those waters. A destroyer always hated to have to request a convoy commander to slow down, and for this reason we would hold on to the limit, plunging through the big seas, covered from bow to stern with spray. But when green seas commenced to come aboard we would have to give in, as this meant the buckling of stanchions, deck plates, or bulkheads. Sometimes an unusually large sea would unexpectedly be met with before we had slowed down. This happened on one occasion to the *Little*, just outside Brest, and resulted in the carrying overboard of a ready ammunition rack, riveted to the deck, and full of 4-inch charges; the dishing in of the forward chart-house

bulkhead; and the smashing into smithereens of all the unshatterable glass windows of our built-in bridge.

The operation orders issued by Admiral Wilson at Brest were similar in essentials to those of Admiral Bayly at Queenstown. Also our mode of procedure on receipt of orders was somewhat similar, the main difference being that from Queenstown we often joined the outgoing convoy at some other port or at sea, and usually escorted the inbound ships to some other port, or dropped them off the Smalls; while from Brest we left port with the troop ships, and returned to port in company with troop ships.

It was natural of course that the troop ships, which were officered and manned entirely by naval personnel, should be more expert in keeping position in convoy than the merchant ships. The troop convoys, as a whole, were better drilled, and more prompt in reaching appointed rendezvous. Communications were efficient, both as to radio and visual signals. In fact, insofar as the escort commander was concerned, the duty with the troop convoys was a sinecure compared to that with the store ships. The stronger escort furnished the troop ships, together with their greater speed, lessened the chances of a submarine making a successful attack. On the other hand, we could not help but feel how much greater our responsibility would be should one of these transports be torpedoed while loaded down with troops. If a cargo ship was sunk her freight went down with her without much thought concerning it. But if a loaded troop ship were torpedoed, we of the destroyers would of course make every effort to save as many as possible of the valuable human lives.

This important question of how best to proceed in case a loaded troop ship was torpedoed was one of much concern. Then, also, there was the increasing chance of the Germans making an attempt to destroy a troop convoy by means of a fast and powerful raider. To cover these points, and many others, the destroyer commanders developed a doctrine which was issued by Admiral Wilson under the title of "Orders in Escort for Troop Convoy." It was modeled after "The Orders in Convoy," issued by Rear Admiral Gleaves as Commander of the Cruiser and Transport Force.

These orders in escort eliminated the necessity for the escort commander to issue a long detailed operation order each time



One of the new destroyers making smoke screen and laying a depth charge barrage

we went out. Everything was covered, from the manner in which to leave port, to the manner of returning. It became only necessary for the escort commander to state the time of departure, the order of getting under way, and the numbered position each destroyer would occupy in the screen. The rest became automatic according to the doctrine.

Of the twenty-three paragraphs in this order the last three will be reproduced here, as they indicate the destroyer tactics of the period, by detailing the procedure for action should a submarine be sighted, a transport be torpedoed, or a raider attack the convoy:

21. Following procedure will be followed if submarine is sighted. Always make visual and whistle signals indicating the submarine's presence.

(a) If near convoy—that is if almost within torpedo range, or if submarine has fired a torpedo, the destroyer first sighting the submarine or torpedo wake, and the destroyer on either side: i.e., the next ahead and astern, will attack by making depth charge barrage over the probable area. It is important that the two assisting destroyers lay their barrage at sufficient distance from the center one so as not to interfere.

(b) If the submarine is sighted on the surface at a distance of several miles, the destroyer nearest, or first sighting it shall open fire with guns and proceed immediately at twenty knots or best speed that state of sea permits, to attack submarine with depth charges. The next two destroyers shall also proceed on parallel courses using guns as long as submarine remains on surface. On arriving at probable position of submarine, the first destroyers will lay a barrage on the assumption that the submarine has taken a course directly away from the convoy; the destroyers on the right and left will respectively lay barrage on the assumption that the submarine changed course to the right or left.

(c) At night. Unless visibility is unusually good, one destroyer shall make the attack, as the danger of collision is great. Of course if a second destroyer sees signs of the submarine, it will attack also.

(d) In all cases, continue the attack and search

- (1) Until the submarine is destroyed;
- (2) Until the convoy is below the horizon, or longer, if there appears a chance of getting the submarine; or
- (3) Until recalled by the escort commander.

22. Procedure in case transport is torpedoed.

(a) If there are no troops on board, the three destroyers making the attack will stand by the transport. After the attack is completed, the senior will circle the transport, dropping depth charges at intervals. The two juniors will pick up survivors as soon as conditions warrant. If the escort commander remains on the scene (as is probable for a while at least), one destroyer should be directed to rejoin convoy. So long as vessel

remains afloat, at least two destroyers will stand by. If she sinks, the two destroyers having survivors on board will return to port.

(b) If there are troops on board the same procedure will be followed, excepting that the destroyers detailed to pick up survivors will, as soon as loaded to capacity, proceed to join the convoy, and the two additional destroyers will then return to torpedoed ship and pick up survivors. This procedure will be continued until all survivors are rescued. It will be noted that one destroyer continues to circle ship and boats at all times.

(c) The capacity of destroyers for accommodating survivors will be considered as 600 for the smaller destroyers, and 800 for the larger ones. In bad weather this number should be reduced. In good weather the number could be increased, provided the emergency required it.

23. Procedure in case of attack by raider or raiders.

(a) Under all conditions.

(1) Assemble by divisions, using column formation. Make smoke screen between convoy and raider. This can be done whether raider is to windward or leeward, as in the first instance the smoke will blow down on convoy, and in second instance it will blow down on raider.

(2) The raiding force will then be attacked, in accordance with one of the following plans, which will be indicated by using the signals provided in the battle signal book.

Plan No. 1. Attack independently by divisions.

If only two divisions, attack from each bow of raider. If more than two divisions, other divisions attack from beams. Use smoke screen if conditions warrant.

Plan No. 2. Same as plan No. 1, excepting that second division will continue to smoke screen convoy, so long as that protection is needed. If there are three or four divisions, this duty would fall to the third or fourth division, as the case might be.

Plan No. 3. Attack by entire force together.

Each division attack through the smoke screen of another division. That is the division most favorably placed to make a screen does so. The division nearest to it proceeds through the screen, and if within torpedo range, fires torpedoes. If not within range, makes smoke screen, and the other division attacks through screen. This is repeated until successful attack is made.

Plan No. 4. Attack independently by ships.

In this attack the destroyers will separate and attack from all sides, closing as fast as possible.

(b) The two junior ships of the two junior divisions will not join attacking formation, but will screen convoy as long as possible, and then trail raider should she escape. If there are only two divisions, only the junior ship will perform this duty.

In order not to unduly alarm the troop ship commander, we had a little private code of our own for reporting contacts, submarines, and other ships. This code was attached to the Orders

in Escort, and led to rapidity of understanding. There was nothing in it that would be of value to the enemy should it be broken. There was not much chance of a German submarine successfully employing the code, as they used a different spark, and our operators got to know the sending characteristics of the various ships that worked together.

I was often told by those on the transports that they were glad to see the destroyers, and that for the troops on board there was always a thrill at the sight of these little vessels, coming in from all directions to take their stations around the big ships. To them there was something mysterious in the way these shadows suddenly appeared from out of the ocean, just at the time rumor had it that they were due. But in fact it was all very simple. In accordance with the doctrine, the destroyers would be proceeding, in their allotted positions on the scouting line, where they had been sent at daylight. Then suddenly, perhaps two or three would simultaneously sight a smudge of smoke on the horizon. Whichever one had the smoke nearest ahead (this was known from their own relative positions) would flash out on the wireless the single code word, "contact." That was all that was necessary to start the concentration movement, so that when the destroyers were sighted by the troop ships we would already be converging on them from all along our thirty-mile front. And each destroyer, without signal of any sort, would stand for its station, wheel about, and unconcernedly begin its patrol at a distance of from 800 to 1,200 yards from the convoy. The destroyer escort commander would signal the ocean escort, which was usually a cruiser of the *Seattle* class, whether or not there were any orders for her, and that the destroyers would take over the escort duty. Immediately the big cruiser would reverse course, headed for home at the best speed her fuel on board would permit. Then the senior destroyer commander would signal to the convoy commander any special orders he may have had. After that—incessant vigilance until the big ships were safe inside Brest.

So impressed were the transport personnel by the joining of the destroyers, and so freely did they express their admiration, that even our naval officers, who understood the simplicity of the procedure under normal conditions, would at times become

enthusiastic and take official cognizance of the episode. For example on one occasion Captain E. T. Pollock, who was in command of the *George Washington*, made a report to Admiral Wilson in which he stated:

1. I desire to bring to your notice officially that when the Eastern escort made contact with this group shortly after daylight on the date set, the weather during the night had been thick and foggy, and it was still thick, visibility being about two miles.

2. The excellent manner in which they made contact under such conditions has been considered almost uncanny by the General Commanding Army Forces, as well as by the United States Senator on board.

It so happened that this convoy carried the largest number of troops that entered Brest at any one time during the war. There were thirteen transports carrying more than 40,000 men. The escort, after three sections had joined, was composed of sixteen destroyers.

It can readily be understood that we of the destroyers appreciated such a letter as this of Captain Pollock. While the finding of a convoy was usually simple, there were times when a certain amount of judgment had to be exercised as to when and where to start the scouting line, and the distance between ships on the line. If the weather had been such that both the destroyers and the convoy were doubtful as to their positions, owing to the lack of opportunity for obtaining fixes by observations, and if it was still thick when contact was due, it can readily be imagined that the destroyer commander would feel somewhat nervous as we moved forward on the line and no contact was made. And then, when a ship of the convoy was sighted, and the contact report came in, what a relief it was!

It was my good fortune never to miss a convoy, but there were several narrow squeaks—such as when the destroyer on one end of the line made the contact. On one occasion, during thick weather, a merchant convoy was ahead of schedule, and we picked up one of the flank ships just as we were starting to form scouting line.

It was probably the strong escorts afforded these inbound convoys that prevented the German submarines from making a single successful attack on one of them. But they did succeed in torpedoing several outbound ships, which were always more lightly guarded. In one of these attacks, that on the *Covington*,



Navy Official Photograph

"DENT"

A 1200-ton destroyer showing camouflage of our own navy department design

I happened to be the escort commander. This was the only ship, in more than five hundred that I assisted in escorting during the war, that I saw torpedoed. And I have always felt that the German submarine that did the deed had very good luck. In the first place, it was known at our headquarters that this submarine was operating on or near the designated track of the convoy. A message was sent for the convoy to change course, but, as sometimes happens, the message was garbled in transmission. When it finally came through in understandable form several valuable hours had been lost. The course was changed shortly before dark, and the convoy was still zigzagging, when without warning the torpedoing occurred. This submarine had evidently followed the then usual procedure of submerging ahead of the convoy, keeping on a heading at right angles to the course of the approaching ships and, instead of keeping a periscope watch which might make his position known, relying entirely on his listening devices. As soon as the propeller sounds indicated that the convoy had passed over him, up he would bob, and let fly a browning shot into the center of the convoy. Then, without waiting to learn results, he would make a crash dive and work himself away from the scene. The destroyers would undoubtedly shake him up with their depth charge barrage, but this was a chance he must take, and at times did take, when the escort appeared light.

We in the destroyers had recognized the change in submarine tactics, which forced them to remain submerged until the convoy and escort had passed over them, and had countered this move by having a destroyer on each quarter of the formation, in addition to one which covered the rear, whenever the escort was of sufficient size to warrant this disposition.

FALSE ALARMS

In every kind of warfare there are more or less false alarms. But operations against submarines seemed to lend themselves to this form of disturbance and discomfiture, both for those who were hunting the enemy and for those who were on the defensive against him. Some of the alarms were due to illusions, and some just happened. Of the former class were those where some floating object was mistaken for a periscope, or where some

ship was reported as a submarine. The periscope false alarms were much more frequent, at first, than toward the end. But even to those who had the most experience would such occurrences happen. And when any one reported a periscope no chances could be taken; immediate action was necessary, just as if certain the submarine were there.

When on escort duty, my fixed rule, if any one reported a periscope, was immediately to drop a depth charge. The argument was that *if* a periscope was really seen the submarine was close aboard the convoy and therefore about to fire a torpedo. The explosion of the depth charge would let the submarine know that he was seen and being attacked, and might make him discontinue the attempt to torpedo, or cause a sufficient nervousness to make him miss even if he should fire. So there were several occasions where the convoy was alarmed by the *Wadsworth* or *Little* suddenly letting go a charge.

One of these last scares happened in August, 1918. The convoy of large ships had just formed up after leaving Brest, when two of my lookouts reported a periscope 800 yards on the port bow, and both said they had seen the glint of the glass. Immediately the depth charge, full speed ahead, and hard over rudder. Soon I also saw the periscope. But it turned out to be a lantern on a small buoy marking the end of a drift net.

And even as late as August, 1918, all of us awake at the time were disappointed that a submarine which crossed the moon rays only about a mile away, turned out to be a small French gunboat, which did not show recognition lights until we were nearly on top of her, in our great desire to ram. Such incidents as these, occurring at almost any time, kept everyone on the qui vive, and prevented the life from becoming too monotonous.

Of that class of false alarms which just happen, I had one or two unusual experiences. One very dark night while five destroyers were escorting the *Leviathan*, the officer of the deck reported to me through the speaking tube: "Fired a red star!" This signal called for a change of course to port, either because a submarine had been sighted, or because we were running into another convoy. When I reached the bridge, the huge hull of the *Leviathan* could be seen standing off to port. The follow-in colloquy ensued between me and the officer of the deck:

"See anything?"

"No, Sir!"

"Who fired the red star?"

"I *think* we did, Sir. It looked as if it came from this ship."

"But *who* fired it? Where is the pistol?"

"Hanging in the usual place, Sir."

When the pistol belt was removed from the hook, the holster was found to be empty! A search on the deck of the bridge brought forth the pistol with its exploded cartridge. Due to the vibration, the pistol had shaken from the holster and had fallen on the deck, the hammer striking at such an angle that the red star shot out between the rail and the awning.

"Well," I said, "Let's fire a green star, and get everybody back on the course."

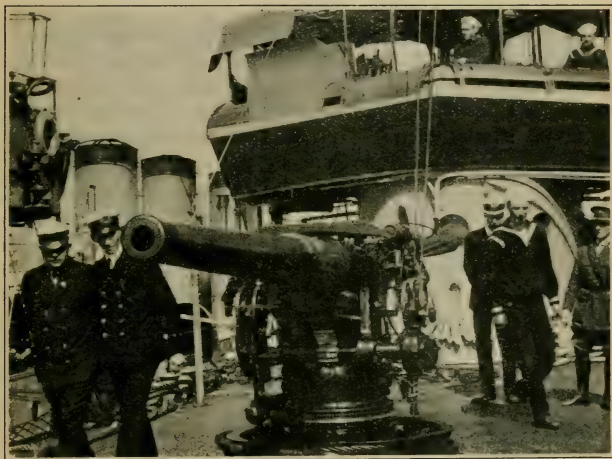
On another occasion, this time in daylight, while we were escorting a big troop convoy, I was eating lunch when the whistle gave a sudden prolonged blast. Rushing up on deck, I noticed the green submarine warning flag flying at the yard arm. Continuing to the bridge, I was met by the officer of the deck saying "False Alarm, Sir!" What had happened was very simple. The lookout in coming down from aloft carelessly let his foot slip, causing him to fall across the whistle cord. To save himself he grabbed at the first thing in sight, which happened to be the halliards of one of the submarine danger flags which were always kept rounded up at the yard arms. In this way he unintentionally completed the prescribed alarm signal, by sounding the whistle and breaking out the flag simultaneously.

VISITORS

Neither while at Queenstown nor at Brest did we allow promiscuous visiting on board the destroyers. At no time were ladies permitted on board, and never did we have what might be called a party. But there were social visits from the officers of the allied services, and frequently when in port, would they break bread with us.

The lack of opportunity on the part of the people in general to visit the destroyers, together with the secrecy maintained in regard to their operations, undoubtedly had much to do with the feeling that it was an unusual privilege to see one of these vessels,

which privilege should be obtained if possible. So the commanders of the forces at both Queenstown and Brest had requests from many sources for permission to visit the destroyers and to make a trip in one of them. But the desire of people to see the American destroyers was not limited to those who had to ask for the privilege, but included many whom we of the destroyers considered it an honor and privilege to have come on board. While at Queenstown several high ranking British naval of-



British officers inspecting the forecastle 4-in. gun on the *Wadsworth*. This picture shows the gun before spray and wind shield were installed, and the bridge before it was built-in with glass windows.

ficers informally inspected the *Wadsworth*, and Captain E. R. G. R. Evans, R. N., made a four-day patrol trip with us.

During my three months' duty at Brest, the *Little* was favored on several occasions by visits from French officers. But the greatest honor we had was the visit of President Poincaré, who, accompanied by our Admiral Wilson, and by the French Minister of Marine and a large retinue of officers, spent three quarters of an hour on board the *Little*. On the President's departure I told him I would consider it an honor if he would send me his photograph as a souvenir of his visit. A few months later, after my

return to the United States, I received the photograph, autographed, and suitably framed.

Many newspaper men were, of course, anxious to take a trip on a destroyer. I had the pleasure of taking two of them out on the *Little*. One was a young American whom we all know by reputation, Mr. Frazier Hunt of the *Chicago Tribune*; and the other an elderly Frenchman, M. Grosclaude, a noted journalist.

Mr. Hunt came on board full of pep and energy, prepared to enjoy to the utmost his experience. I can recall now how delighted he appeared as he stood on the bridge, while we got under way and stood out of the harbor. But no sooner had the *Little* put her stern outside the Goulet than Mr. Hunt succumbed to the call of the sea, and disappeared below. I recall that this trip was one of the smoothest it had been my fortune to make. But to Mr. Hunt it was terribly rough! It so happened also that this trip was replete with incidents. We dropped a depth charge, fired our gun at a buoy, and started to ram a French patrol boat which was mistaken at night for a submarine on the surface. On each of these occasions I have a faint recollection of seeing a pale, gaunt figure come up the hatchway for a few minutes, and then shortly disappear to remain below until the next excitement brought him forth.

During Mr. Hunt's stay on board there kept running through my mind that song we used to sing on our practice cruises, the refrain of which went:

Oh Mr. Captain stop the ship,
I want to get out and walk!
I feel so flipperty, flopperty, flip,
I'll never reach New York—
Oh Mr. Captain stop the ship,
I'm sick of the raging main,
Hi! Hi! Call me a cab,
And take me home again.

I know that is the way Mr. Hunt felt. On arrival at Brest he could not get ashore quick enough. But the next day he came on board all smiles, and declared he had had the time of his life. He confided to me that as he had not seen much of the ship during his five-day trip, he would like to look her over! He then went ashore and wrote a series of three articles which were published

in the Chicago *Tribune*, and which were as good an account of our trip as it was possible to write.

Monsieur Grosclaude should never have taken a destroyer trip, as he was too old for that kind of life. Admiral Wilson tried to discourage him, but he insisted. He came on board shortly before we sailed, bringing with him four large suit cases. He was much perturbed because *most* of his luggage had not arrived. What worried him considerably was that his storm clothes were missing. So we furnished him with a full outfit, raincoat, sweater, boots, and southwester. Imagine the hit he made when, just before we got under way, he appeared on deck in this full storm regalia, it then being a beautifully clear and almost breezeless day! But if the dear old gentleman had not worn his storm clothes then, he never would have worn them, because if needed at sea, he would have been too seasick to get out on deck.

For a couple of days, M. Grosclaude did not eat anything, and I never will forget how pleased he was on the third or fourth day out when he succeeded in keeping down his tea and toast. My recollection is that he never did get beyond the tea and toast stage. Yet, after we arrived in port, he declared he would not have missed the trip for anything. He managed to get up on deck when the destroyers joined company with the inbound convoy, and to him this sight was worth all the pain and discomfort he had been through.

The Reverend Melville Gurley and Dr. Harry Fosdick both made trips on the *Little*. They were overseas with the Y. M. C. A., and, of course, did not want to miss anything. Mr. Gurley, if I remember rightly, was the only civilian passenger we carried who did not get seasick. He was up and around at all times, mingling with the men and not missing a trick. He even conducted church services on Sunday, something we did not often have on a destroyer.

In Dr. Fosdick we found an unusually delightful and interesting shipmate, in spite of the fact that he was seasick part of the time. He took great interest in everything, and told us more about our Army at the front than we had heard first hand. He was much interested in our sailor men, and the life they led on board ship. The day we returned to port, he said something that

informed us, for the first time, that he was a reverend. I told him that no one on board knew he was a minister of the gospel, and said I hoped that nothing had occurred to hurt his sensibilities. He assured me that he had not heard or seen a thing that anyone could take exception to, and that he was agreeably surprised at the very little swearing he heard. He said when it came to swearing, the sailors were novices alongside the troops at the front!

In the midst of these false alarms, convoys, visitors, etc., a cablegram came detaching me from command of the *Little* and ordering me to the Navy Department for duty. This was the last of August, so it was not my good fortune to remain with the destroyers during the last two months of the war. My chief regret was that I missed the thrill of turning on all lights, the night after the armistice was signed.

(The End)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE NAVAL POLICY OF THE UNITED STATES IN
THE PACIFIC AREA

BY LIEUTENANT (jg) W. P. ROOP (CC), U. S. NAVY

I.

What strategy is to tactics, policy must be to strategy. Tactics deals with our procedure in the immediate presence of the enemy. Strategy gathers up the total of our naval resources and endeavors to bring them into effective action culminating in a favorable tactical maneuver. Policy seeks a still broader basis and develops a naval establishment in conformity with the objectives which the nation sets before itself, proportioned so that strategy, and in its turn tactics, may follow through to a successful outcome. Tactics forms the ships, strategy the fleet and bases, and policy the Navy.

If tactics and strategy are generally regarded as coming strictly somewhat more within the scope of the technical naval profession, it is partly due to a confusion of policy with politics. Politics, at its best, is the effort to influence policy. It is not part of the function of the naval officer to determine what the nation's objectives shall be. Their real choice lies with public opinion. It is the administration of the means for making national decisions effective that constitutes the primary function of the naval officer. However, it is not sufficient that we should accept certain matériel which is placed in our hands and keep it polished against the day when it may prove useful. The Navy has also in time of peace a campaign to carry on, namely, the setting forth to the nation of the necessities which potential war imposes. We may not tell the nation what it desires, or should desire, nor how to obtain what it desires. But we must consider the military consequences of the desires of the nation. We must clearly under-

stand what the national foreign policy is, and what its military implications are.

Questions of policy are largely questions of information. The best information we can get may be conjectural; unfortunately that is often true also in strategy and tactics. It is, of course, necessary to know the tactical power of the various elements of the various fleets. It is also necessary to know the strategic value of the various elements of power in the larger theater of actual or potential operations. It is still further necessary to know all that is possible to know of the impelling force of the motives that carry us toward war. Unless we are in some degree able to foresee the necessities which political policy is going to impose on the Navy, there is danger that in a crisis the Navy may be found inadequate. The obvious and simple solution is to have a Navy capable of answering all possible requirements. Now that it has been determined not to do this, we must give the most earnest consideration to the question as to what the actual requirements are going to be.

This conception of naval policy, though possibly somewhat broader than that of the Regulations (*N. R. 2053*), is not inconsistent with it nor opposed to it. However, no detailed calculations as to our quantitative requirements in naval strength, as determined by our international relations, will be undertaken in this paper. It is desired rather to advance certain ideas as to the need for preparedness in the Pacific area, and as to the general lines which this movement might appropriately follow.

II.

Suppose the Pacific and its littoral, with the five or six hundred million men living within its drainage area, to be replaced in our thought by a similar area affording similar contacts, among a similar number of beings totally distinct from the human race yet similarly homogeneous and with an equal capacity for communication. We can imagine that the multiform relations which would be developed in such a situation would have great interest for a person with adequate means for observation, and that systematic study would be considered justified, simply as a matter of scientific activity. The value of such scientific work, it is important to observe, would depend altogether on its character of disin-

terestedness (in the sense of personal advantage of the observer.) It is not possible for an individual man to form judgments in the actual Pacific situation that are absolutely impartial, and even less so, where he is one of the five or six hundred million. Nevertheless, if there is to be any clearness of foresight, it is most likely to proceed from exactly this sort of detached observation; such, for example, as that of the biologist in his study of an order of life totally distinct from his own. The strategist must arrive at the same sort of personal detachment. It is necessary, we will suppose, for the gun-captain to visualize the blows his gun can deliver, as being placed by a fist on some individual's chin. But as we proceed to consideration of matters of strategy and policy, it is necessary to think in terms of large units and ultimate purposes.

Now it is one of our characteristically generous American beliefs that there is room for everyone on the planet, if we will only stop fighting and work together. Our tender-heartedness even extends to the point of solicitude for the feelings of dumb brutes, as witness our laws against cruelty, and against use of animals in biological experiment. Since many persons never arrive at the detached viewpoint, even with respect to such a matter as vivisection, it becomes impossible in general for them to distinguish between detachment and cruelty. This is an intellectual defect which must be overcome. Cruelty, of course, no one can condone. But what an absurdity it is to permit a distaste for harrowing thoughts to dominate our foreign policy! We set great store by the idea of equality among men; what we sometimes fail to perceive is, that even after the Declaration of Independence and the Emancipation Proclamation, equality can only be achieved by struggle. We have a noble ideal; let us hope that the course of world events may not lead us in the direction of abandoning the struggle to realize it. But if we are not going to abandon it, how can we undertake to declare our opposition to all international struggle, as a matter of principle? How can we yield to the easy belief that, having arrived at the premier position in the world in point of wealth and standard of living, we can continue to discharge the responsibilities of that position solely by entering on an evangelical campaign to convert the world to our own ideas of pacifism?

It is not possible that the modern world should tolerate the suppression of the individual incentives and humanitarian instincts, which have come to operate more powerfully in our own country than elsewhere. It is still possible, however, to claim a virtue in that loyalty to one's nearer associates, which transcends one's obligations to humanity at large. In fact, the stage at which the development of human character now stands is such that it is precisely in that devotion to our neighbors that we find our most effective antidote to the vagaries of an anarchism which, however beautiful it may become at some future epoch, leads, at present, only toward unhappiness. Altruism may eventually furnish the ruling motive in human relations; for the present it must be tempered with an intelligent regard for the necessities imposed by things as they are.

It is, therefore, necessary at the outset, not only to divest ourselves of passion and hatred, so that our views may be unclouded by our desires, but also to set aside those generous impulses upon which everyone would like to be able to act, and consider matters purely on the basis of our own best ultimate national interest. We believe ourselves to be free from aggressive designs. We believe, in a way, that the salvation of the world depends on America. Let us beware of the complacent idea that this belief is shared by everyone. We desire to see the world freed from the curse of war. Let us avoid the too sanguine hope that such a decisive and complete break with the past can be accomplished without risk and sacrifice, courage and determination.

III.

What do men fight for? A very great deal of thought has been given to this question since 1914, and broadly two opposing opinions have arisen. One is that war is the culmination of a chain of circumstances, of a cycle of events; if only the chain can be broken at a single link, if only the cycle can be brought to its turning point without the mobilizations being set going, then the crash can be postponed; and possibly by a series of compromises the postponement might be continued indefinitely. The other view is that although war is catastrophic, superlatively wasteful, and subversive of nearly everything that civilization strives for, nevertheless it is the only method so far available for

the definitive resolution of certain deep-lying conflicts of interest. According to this view compromise leads only to the accumulation of grievance. The only way to put an end to war is to make it unnecessary, by finding another means of settling matters which war, however great its cost, does have the merit of settling.

Without further discussion we will accept the second of these theories. We will agree that the unity of the United States could not have been achieved, or the ascendancy of Germany in world-power could not have been checked, without war. We will immediately inquire what sort of questions they are which it takes war to settle. Broadly, there are two matters with respect to which men may arrive at that stage of desperation, where war is the only way out: one is their standard of living, the other is their inner convictions. There are two currents which may drift toward war; one proceeds from a conflict of economic interests, and the other arises in political or religious motives.

It would make a highly instructive study in economics to obtain a direct numerical comparison as to standard of living, between the various communities bound together by the Pacific Ocean. Such a study would encounter very serious difficulty, however, owing to the dearth of definite data. There might also be some question as to the standards of comparison. Many of the comforts which we enjoy, others profess not to desire.¹ We are, however, on fairly certain ground in establishing the following scale of standards, beginning with the lowest:

Malaysia.
China.
Mexico.
Japan.
South America.
Australia and New Zealand.
Canada.
United States.

The larger part of the Chinese population lives in such a state of chronic poverty, that the provision of enough food to sustain life monopolizes their attention. That the Japanese stand at a level intermediate between ourselves and the Chinese, is shown

¹ *Chinese Characteristics*. by Smith, is a rich source of information in this connection.

by the fact that American labor, when placed in direct competition with Japanese labor, is seriously embarrassed by the capacity of the Japanese to accept (we will not say withstand) greater hardship. And in the presence of Chinese competition, the Japanese is similarly embarrassed. In default of statistics we will cite a single case which, though possibly extreme, is typical.² Incandescent bulbs are at present being manufactured in Shanghai by an American firm. In America, in 1921, a daily wage of \$10.00 was being paid for a daily task of 1,000 bulbs. In Shanghai the wage was forty cents for 2,000 bulbs. At that same time the actual cost of bare nourishment was not greatly different in Asia and in America. Rice raised in California was exported in quantities to Japan.

Comparisons like this are familiar enough not to require amplification. The disparity between the Asiatic standard of living and ours is so immense that, for our present purpose, it may be regarded as one of the fixed conditions of Pacific relationships that no person accustomed to average American living conditions would be likely to survive a complete shift to average Asiatic living conditions.

Now modern communications are having the effect of placing the various Pacific communities in new and intimate contacts with each other. The result of free intercourse will certainly be to give rise to a tendency to equalization of the standards. There are, of course, many forces by which the tendency to equalization is opposed. Thus customs duties and exclusion laws operate partially to restrict intercourse. Also in America the higher standards of consumption are paralleled by higher standards of individual productivity, the fruit of mechanical genius and a talent for efficient organization. Again, there are America's unmatched and untouched natural material resources. We may with certainty depend on retarding the process of equalization. But it is almost equally certain that we shall not be able to stop it altogether. The standard of living in Asia is rising. Is it rising fast enough to satisfy the pressure for equalization, opposed as it is by the various agencies which can be brought to bear? If it is not, then the only remaining alternative is that our own standard must fall.

² *Fortnightly Review*, January 22, 1922, p. 125, quoting from *American Manufacturers Record* of April 14, 1921.

An individual suddenly transferred from the average working conditions at Gary to those at Han Yang would simply perish. But a nation faced by the prospect of a lowered standard of living will certainly make desperate efforts to add to the strength of those forces, which we have mentioned as acting to retard the movement toward equilibrium. If the nation is unable by peaceable methods to resist a gradual decline, or even unable to maintain a moderate rate of progress, is it not fully to be expected that there will be an attempt to establish more favorable conditions by an appeal to force? We are confronted, we will say, with this situation: Chinese development proceeds to the point where an industry requiring large quantities of unskilled and semi-skilled labor, based on extensive natural resources—in a word, the steel industry—is carried on more cheaply in China than in America, and very much more cheaply, so that Chinese steel can be delivered on the Atlantic seaboard with a margin of thirty per cent for duty and still meet competition from Pittsburgh. Steel consumers are able to prevent an increase in the tariff. Every possibility of cheapened production in America has been followed through. American sales managers will certainly not overlook the alternative of forcing an increase in Chinese costs but control of Chinese production is found to be firmly held in other hands. Is not some sort of intervention almost inevitable? A billion dollar corporation at home has passed dividends for three years. The basic industry is sick. Millions of men are unemployed. An American diplomatic mission in an Oriental city is engaged in negotiations. Murder in the Orient is sometimes lightly regarded; a number of American officials lose their lives in suspicious circumstances. What American administration could resist the pressure for war?

IV.

Turning to the matter of political and religious ideas, we find again, among the various nations of the Pacific, very wide differences, not only of degree, but of kind. Whatever the number of nominal adherents to the religions of self-abnegation may be, religion seems to exert no restraining influence on aggressive enterprise. While the intense individualism of America finds some counterpart in the extremely decentralized social order in

China, both are sharply contrasted with the highly developed national organization of Japan. Military matters, especially, are handled by Japan with a directness which is impossible in our own case.³ And combined with these contrasted orders of social organization, we find Japan and America each holding fast to the conviction that it has a certain mission in the world. Thus, our effort to Christianize the Orient generally, and the formulation of our Open Door policy; and on the other side we find such a sentiment as this:⁴

"The rise of Japan and the abolition of extra-territoriality have exploded the superstition that the world is to be ruled by the whites."

It is impossible to peruse the quite voluminous literature in this connection⁵ without realizing that we are here approaching the fringes of a highly controversial subject.⁶ There is nothing at all to be gained by entering into the merits of this controversy here. Reference is made to two books by British authors which may be specially commended for their impartiality and clearness.⁷

Leaving aside all questions as to Japan's intentions in California, China, Manchuria, and Siberia, all question as to the "yellow peril" and the "white peril," we will content ourselves with the observation that the unbalance in the standard of living as between Asia and America, together with the contrast between the two civilizations expanding and developing on the opposite shores of the North Pacific, create a situation the like of which in the past has never failed to lead to war. If war is to be averted in this case, it will require positive constructive action of a kind which was not available to prevent the disaster of 1914.

V.

The effort to maintain peace in the Pacific might be directed along either of two different lines: we might endeavor to establish another method besides war, for accommodating and re-

³ Professor Sazuko Yoshiro explains, in Chapter V of *What Japan Thinks*, MacMillan, 1921, that such popular control of government as may exist in Japan does not extend to military affairs.

⁴ Count Okuma, in *What Japan Thinks*, page 168.

⁵ See, for example the bibliography in *Current History*, March, 1922.

⁶ The writings of G. B. Rea, and T. F. Millard, two American journalists in Shanghai, have especially served to provoke indignant replies.

solving the existing conflicts of interest by formulating statements of principles for guidance in settling disputes and obtaining, by force if necessary, adherence to these principles; or peace may be maintained by the traditional method, imposed by the unquestioned superiority of a single power, or a coalition of powers.

In considering these matters we must not overlook the possibility that the peace may be preserved to our own disadvantage, and that this might occur by either of the processes which we have mentioned. We can depend on it that no generalized principle will work for us and against our neighbors all the time. For example the acceptance of the Hay doctrine with respect to China is held, in some quarters, to establish a principle which, consistently adhered to, would open the door in California. And as to an imposed peace, what assurance is there that it might not sometime be imposed from the West, by a military force based on the man-power and material resources of the Asiatic mainland? Without shouting about the "yellow peril," it is nevertheless necessary to take these eventualities into consideration.

Let us adhere to fact and avoid controversy. Nothing can be clearer than this: by the terms of the agreements reached at the Disarmament Conference at Washington, one of the various possible courses of events is definitely excluded, as far as the immediate future is concerned. The United States, by agreeing not to fortify any of her possessions west of Honolulu, has definitely withdrawn to a position from which Asiatic waters are entirely out of the range of action of naval forces of the types now available. Guam is 3,300 miles from Pearl Harbor. In the hands of an enemy it could not be successfully attacked without the establishment of an intermediate base, and the guarantee of secure communications between that base and the American mainland. For such an enterprise our present naval forces are entirely inadequate. It is therefore an accomplished fact that the United States is incompetent to enforce peace in the Western Pacific. In view of Mr. Bywater's masterly exposition of this subject, it is unnecessary to expatiate further upon America's weakness there—a weakness which the agreement not to fortify bases west of

⁷ *Japan's Foreign Policies*, by A. M. Pooley.

Sea Power in the Pacific, by Hector C. Bywater.

Honolulu has immensely accentuated since Mr. Bywater's book was written.

Does this signify the entire withdrawal of the United States from Asia, and the abandonment of the Hay Doctrine? In the military sense, yes. In the political sense, no. The same conference was the occasion for the reaffirmation of the Hay Doctrine, the supersedure of the Anglo-Japanese alliance, and the abrogation of the Lansing-Ishii agreement. We reassert all our claims to influence in Asia, and accompany these assertions by a military withdrawal.

It would seem that this would limit future developments to two alternatives: either we will depend on the force of reason and the world's public opinion to prevent peace being imposed from the West, or else we will depend on the strength which China can develop on her own account to prevent the use of her great resources by another power for the purpose of obtaining the mastery of the North Pacific. In point of fact there is a third alternative. It is the alternative which seems most likely to be chosen, and it furnishes the key to our future naval policy.

The third alternative is this: dependence will be placed on naval power which is potential only. In the past, the existence of a fleet in being has been the power that has served to resolve the *impasses* of diplomacy. It is now expected that the capacity for rapidly creating such a fleet shall serve the same purpose.

VI.

Let us examine the implications of this idea. First of all it is necessary that the matter should be very clearly understood, both by ourselves and by our potential enemies. There is no way in which naval power can more surely lead us into war than by giving an impression of weakness which we do not intend shall exist. We insist on the considerations for which we believe our potential strength should command attention, while from the other side the flow of events is too apt to be influenced only by our actual strength. It lies in man's nature to discount the future. If our potential strength is to be left undeveloped, we must at all events make it clear to what extent it would be developed if circumstances should require. Otherwise, we will find it necessary either to acquiesce in a situation involving the loss of prestige

and influence, which would go with exclusion from Asiatic affairs, or else we will find it necessary to carry through to a conclusion a war which will ultimately require the development of a very large part of our latent power.

As it happens, total permanent withdrawal from the Western Pacific is not consistent with our past policy, is not consonant with our obligations already assumed there, nor is it conducive to our own best interest. There appears to be no actual intention of thus reversing our policy, but the important thing is that this should be clearly understood.

The unambiguous statement of our intentions, so far as we ourselves know what they are, with due precautions to prevent a *double entendre* such as will sacrifice the peace of the future to the convenience of the present, thus appears in the light of a solemn duty, a substantial contribution which we could and should make to the cause of war-prevention. But this is not the only responsibility thrown upon us by the present situation. We have boldly stepped in and pursued an energetic initiative in the diplomacy of the Pacific. The best traditions of our Pacific policy have been upheld and extended. If it ever was possible for us to assume an attitude of indifference, neutrality, and non-intervention in Pacific affairs, such an attitude has now become impossible. The isolation from Europe which the Monroe Doctrine was designed to maintain, and of which our non-participation in the European conferences is the latest phase, is not paralleled by our Asiatic policy. The Hay Doctrine is the outgrowth of American ideas applied to Asia. These ideas are fundamentally pacific, but the application to Asia is fundamentally aggressive. Whether the motive be economic and strategic, or whether it be the evangelization of the world for democracy, in any event the fact is that we are committed to participation in Asiatic affairs; and by taking the lead in the Disarmament Conference we have increased, rather than decreased, that commitment. Whatever happens in Asia and in the Pacific, we are in large measure responsible. The treaties of 1922 occupy a central place in the international law of the Pacific, and they are our treaties. We must be a party to any action affecting the treaties or the matters with which the treaties are concerned. Whatever the terms of the treaties or of future trea-

ties, the fact is that we occupy a leading position in any negotiations as to the relations of the world-powers to Asia. Whatever we have to say about Asia will receive attention; and if we say nothing, that also will have its significance. Nothing that we can do, or refuse to do, can alter our responsibility for peace in the Pacific.

The question as to how we may best proceed to preserve the peace is one for which an answer must be found. What means are there for protecting our standard of living from Asiatic encroachment? Is trade with China, present and potential, of sufficient importance to warrant active governmental support in its development? Is our influence for advance in living standards, for stability and freedom from foreign domination in China of sufficient value to China, to the world, and to ourselves, to justify the effort to extend it or to maintain it? Are the Philippines, from any point of view, worth keeping? Can we afford to lose prestige in the Orient, as we necessarily would by abandoning our experiment in colonial administration? What means, if any, are necessary to forestall the establishment of an Asiatic hegemony, directing China's material resources and man-power to the military or industrial mastery of the Pacific? Where is the line between yellow and white to be drawn? All these questions must be answered. By undertaking to limit the capacity of the interested powers for obtaining the answers through the use of military means, we undertake the responsibility for establishing the principles upon which to found the peaceable adjustment of the difficulties. If this responsibility is to be accepted, the Washington Conference marks a beginning and not an end.

VII.

Suppose, on the other hand, that we decline to accept this responsibility for solving these problems peaceably. They will not solve themselves. The peace cannot be maintained simply by limiting armaments. If the force of reason be not established, inevitably the appeal to arms ultimately will be made.

War, we will suppose, is again a reality. Guam and the Philippines are still subject to our military control, but both are to be had for the taking. Will they therefore be simply evacuated by the American forces? Certainly not. Every effort must

be made to retain them and to prolong their resistance to capture. Such resistance is of the greatest value in gaining time for subsequent operations. Had there been no desperate losing fight at Liège and at Mons there would have been no Battle of the Marne. Such resistance has especial value in view of the probable effort of the enemy to deliver an energetic surprise action at the start, probably against the Panama Canal, with the intention of closing it before the junction of our fleets. The prevention of such a success might depend on a week's resistance at Manila.

Let us consider this point somewhat more in detail. The effectiveness of the fortifications at Panama has been questioned. It is certain that dependence is placed on the very great superiority of a shore gun over an identical gun afloat. Without passing judgment as to its probable success, it is safe to assume that some effort to close the Canal will be made. Now in the case of a very sudden onset of war, it is quite possible that the junction of our fleets might be delayed by reason of the limited overhaul facilities in the Pacific, necessitating use of the Atlantic docks. Of course the closure of the Canal at any stage would be a very serious setback, on account of the interruption of the stream of supplies; but it would be doubly so if it occurred before the Atlantic Fleet went through. Railroads can deliver supplies, but not ships.

Manila in our hands would embarrass the attack on the Canal. It might not be possible to make use of Manila directly to prevent operations against Panama, for Manila does not flank the great circle route to Panama, any more than Samoa flanks the route from Honolulu to Panama. Nevertheless the delay necessary for taking Manila might be sufficient to turn success into failure at Panama. Or if operations against Manila and Panama were carried on simultaneously, the division of forces might have the same effect. Again, if operations against Manila were postponed until after the attack on Panama, failure at Panama would open the way to an early offensive on our part, in which the continued possession of Manila would not be entirely without value. It may be questioned whether any major ships would be risked in early operations against Manila or its communications. Defense against attack from other vessels would be a matter of keeping the communications open to the garrison operating against the enemy's investing forces, with offensive operations against his

water communications. With our battle fleet intact, the maintenance of these communications would be a matter of the rapid development of a sufficient tonnage of cargo carriers and troop transports, with suitable protecting armament and convoy. If with the help of such forces Manila could be held temporarily, the problem of relieving Manila would be primarily one of providing the troops, munitions, and transport necessary for land operations, and of creating an island base for operations against the enemy's water communications.

Guam, it is assumed, would be lost at an early stage. Its value to our forces would be very great if it could be retained, but it could not. Its value to the enemy forces would not greatly add to that of the numerous island bases already available. These island bases would constitute a constant source of difficulty to our line of communications, and this difficulty would be greatly increased if any of them should be sufficiently fortified to be able to resist attack without the support of mobile forces. However it is now agreed that none of them shall be so fortified. We may therefore assume that such island bases will have only such protection as it may be possible to provide after war begins. Under these circumstances, the only advantage either belligerent will have over the other will lie in the relative distances of such bases from home ports. If the enemy can maintain his island bases more successfully than we can, he will cut our communications with Manila. But if we can maintain the advantage in the island bases, it will be possible for us to cut his communications with Manila.

The defense of Manila is almost purely a strategic and tactical matter. The questions of policy were settled by the Disarmament Treaties. If Manila can be held for a few weeks, an adequate merchant navy and an assured supply of munitions would be of great assistance in the relief of the city. But the potential Navy before referred to will play no great part. If the potential Navy cannot prevent the war, it may possibly assist in ending the war if, and when, Manila is relieved. But it is far more likely that the outbreak of war will force the conversion of the potential Navy into an actuality.

VIII.

Manila has fallen. Every objective is now shifted. Manila is no longer of any importance. If Manila had been relieved, there would have been an opportunity for a peace that would leave the prestige of the United States unimpaired, and our reputation for non-aggression heightened. But with Manila gone, no choice remains. The mastery of the Pacific must be obtained, once for all. If we do not obtain it, the enemy retains it. His sea power must be effectively extinguished. It is clear that the weapons that we now possess are totally inadequate, for the essential objective is control of the Straits of Korea and the establishment of a blockade. This necessitates the destruction of the enemy fleet, which is impossible to accomplish from Pearl Harbor. Guam must be recaptured, and a first class base established there; the new fleet must be built, manned, supplied, docked at Guam, and guided to victory.

There are recruiting and training problems of course, financial problems, publicity problems, and no end of others. But behind all these is an immensely greater task, in attacking which our efforts in 1917-18 will have to be greatly surpassed. It will not be possible for us to win the war in the Pacific with anything less than the mobilization of the entire nation. The Navy has been preoccupied hitherto with development of a fleet, and to a less extent with the personnel to man it. It is now generally realized that new bases are more important than new ships. But it is not yet generally realized that in the Pacific these bases will have to be so located, that logistic problems of an absolutely novel order are presented. We must project into the remote Pacific not an airplane force, with a range of 150 miles, not a battleship force, with a range of 2,000 miles, but a complete shore establishment sufficient for maintaining the airplanes, the battleships, and a very large number of the various other types of vessels. Home production must be adjusted not only to supply the fleet, not simply to supply the munition workers with food and necessities, but to the creation and maintenance of a base in the Far Pacific larger than all the American bases now existing in the Pacific. Operations like these will necessitate a nation-wide organization, of a quasi-military character, for purposes that are industrial.

We have, of course, a national industrial organization, and this

organization is, for purposes of peace, highly effective. Given time enough, war can convert this organization into one that is moderately effective for purposes of war. But that is by no means sufficient. We must have the means for accelerating this conversion. It is fair to suppose that public opinion will be convinced that war is necessary. Everyone, we will say, will be anxious to help. But good intentions will not turn the trick. There must also be leadership. Our industrial campaign must be planned in advance. Upon whom can we depend for this leadership? Upon the civilian captains of industry? Yes, far more than was possible before 1917. Thousands of men now influential in American industry saw service with the Navy in 1917-18. But these men lost no time in returning to their civilian occupations. The Navy has entered into their experience, but now it lies in the background. We can depend on these men to bring the Navy to the forefront of their attention after the war has begun. But that is going to be too late.

The industrial campaign must be planned in advance as carefully as the military campaign. This is the chief requirement of the policy of the potential Navy. In the event of the fall of Manila and the conversion of the potential Navy into an actual Navy, *the industrial campaign will have to be won before there will be an opportunity for any further military action.*

IX.

From an industrial point of view the Navy is not adequately prepared, and is in danger of going backward rather than forward. The Navy Yards, after having been built up to a very high level of achievement, are relapsing into the state where the principal concern is the matter of determining what men will be least difficult to get along without. As to the officer personnel, the outstanding feature is a sterile discussion of amalgamation of staff corps with the line. The burning question is this: how can the Navy's capacity for effective industrial action be increased consistently with other requirements?

The Navy Yards must be saved. There is talk of making the necessary dispositions so that their plant and personnel may be available for competitive bidding on government work outside the Navy. May the talk presently lead to action!

But it is perhaps even more important that the officers of the Navy should be led to realize their new responsibilities and adapt themselves to the new requirements. At the present time officers qualified for industrial responsibilities are limited to the Construction Corps, the Supply Corps, and those line officers who, while on Navy Yard or inspection duty, give serious consideration to the industrial features of their work. If the present proportion of line duties to industrial duties is as 4 to 1, a reasonable value for this ratio would be 3 to 1. It is not proposed to increase the percentages assigned to the Construction Corps and the Supply Corps, but it is maintained that the relative importance of the industrial functions of the Navy, as compared with the line functions, is greater than is at present generally allowed. The industrial functions are not so highly specialized that some of them cannot be successfully carried by line officers who set themselves to the task, but they would be more successfully carried on than at present if their importance were more fully appreciated. The trend of modern industry is in the direction of functional organization; every person must have a definite job, know what it is and be fitted to do it—not only the passer boy, but the foreman and the superintendent as well. In time of war, as well as in peace, industrial supervisory functions will be exercised by line officers. It is a matter of the utmost military necessity that these functions should be performed efficiently, and with knowledge of the limitations of industrial, as compared with purely military, organization.

It is suggested that younger line officers who are temperamentally inclined that way should be encouraged to interest themselves in industrial management and increase their familiarity with it, not only by reading and some form of instruction, but also by practical contact with men of experience, even though these should happen to be staff officers or civilians. There are deep-lying differences between naval administration and industrial administration. Neglect of the second may easily be as fatal, in a war in the Pacific, as neglect of the first would surely be.

Our great fault in 1917 was the year's delay between making up our minds and getting started. What was then done in twelve months, we must next time be prepared to accomplish in less than twelve weeks. We remember the grim comment that every day

the war continued cost us \$25,000,000. In a war in the Pacific, the cost of delay will be measured in larger units, if, indeed, it does not lead to consequences that are irretrievable.

We must have an efficient, even if moderate, force afloat, with adequate supply and repair bases. If behind that we can combine, with a suitable reserve and auxiliary force, an industrial organization capable of prompt action, and if the facts are known and our intentions clear, Manila may never be invested. If Manila is relieved, our potential Navy may possibly assist in the conclusion of an honorable peace. And if Manila should fall, there is nothing that would shorten the duration and diminish the cost of the long war that would follow, as much as immediate successful attack on the industrial problem.

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A "WRINKLE OR TWO" IN HANDLING MEN

BY CAPTAIN E. J. KING, U. S. NAVY

Practically all of the herein described "wrinkles" have been tried out and found useful in dealing with men. While the writer does not recall having seen or heard of many of them during some twenty-five years of service, it is more than likely that all of them came to his knowledge and attention in that way. It is known, however, that most of the practices herein described are not in general use in the service. It is hoped that their relation may prove of interest and possibly of profit.

HOLDING "MAST"

First, the preliminaries of holding mast should invariably include the assembly of all concerned in the uniform of the day. Whether this takes officers and men from their work for a longer rather than shorter period would seem to be of little relative consequence compared with the advisability of indicating to "all hands" that the holding of mast is an "occasion," as it is. The commanding officer, representing the Government (Secretary, President, People), is about to hold court for the administration of justice.

Second, men who are up for commendation, for swearing to claims, beneficiary slips and for similar reasons should be dealt with before delinquents.

Third, the division officer of each delinquent should be present as a competent witness as to character, reliability and general conduct. The division officer should be called upon for a statement by the commanding officer before decision is made in a given case.

Fourth, when all is ready for dealing with the delinquents,

the commanding officer should himself read aloud Article 1, of the Articles for the Government of the Navy:

The commanders of all fleets, squadrons, naval stations, and vessels belonging to the navy are required to show in themselves a good example of virtue, honor, patriotism, and subordination; to be vigilant in inspecting the conduct of all persons who are placed under their command; to guard against and suppress all dissolute and immoral practices, and to correct, according to the laws and regulations of the navy, all persons who are guilty of them, and any such commander who offends against this Article shall be punished as a court-martial may direct.

The reading of this article will serve to indicate clearly to all present that the proceedings thus begun rest on the firm foundation of the basic naval law, and to emphasize the impartial and judicial nature of the proceedings. It is sometimes well, before this reading of Article 1, to explain in a few words the origin and history of the Articles for the Government of the Navy.

It may also be advisable, on suitable occasions, to read further pertinent extracts from Articles, as Article 8 (1) in a case of gambling:

Such punishment as a court-martial may adjudge may be inflicted on any person in the navy.

(1) Who is guilty of profane swearing, falsehood, drunkenness, gambling, fraud, theft or any scandalous conduct tending to the destruction of good morals.

Fifth, many men—most of them, in fact, are helped to a better presentation of their own cases where they are asked "What seems to be the matter?" "How did this happen?" or similarly phrased questions indicating a desire to hear all that the man may have to say in his own behalf. The usual stereotyped "What have you got to say?" is likely to invite a hopeless, defensive, or even resentful attitude, which is not helpful to the main issue—that of the administration of justice.

Sixth, in some cases it is useful, before announcing a decision, to read aloud that part of Article 24—the punishments that can be awarded by a commanding officer—relating to men.

Seventh, the foul language used by all too many of the men is an abomination—soap and water for washing the mouth may be effective but is probably of doubtful legality—but extra duty as special masthead lookout will put the offender in a "cleansing" atmosphere, for a time at least.

PROBATION WITHOUT TRIAL

Still another method of dealing with delinquents would appear to merit consideration. In cases where trial by deck court or by summary court-martial is indicated as commensurate with the nature of the case and the character of the evidence, it might be well to consider placing the man on "probation without trial."

Such a procedure could only be used: first, where the nature of the case permits; second, when it is the man's first serious report on his current enlistment or his first offense for a long time (say, over a year); third, with the distinct understanding that if the man again commits himself he will be tried for this offense, as well as the new one. It should be clearly made known that if the man completes his probationary period (three to six months) with good behavior, the award on the original report will be "cancelled" or altered to "warned."

The incentive to the man is obvious, while the discipline of the crew if anything may be expected to improve by such a procedure. A "by-product" is the elimination of time and energy in carrying through the trial by the convening authority, the members of the court, the reviewing authority, and many others. It is, in effect, the employment of "suspended sentence" by the commanding officer.

The only point in this suggestion which seems to require confirmation is whether it is permissible thus to involve the delay in trial of the original offense, as is inevitable in a case where a later offense makes necessary trial for both. But the circumstances in such cases seem to justify probation on the one hand and to sanction delay on the other.

RELEASE FROM CONFINEMENT

Men released from solitary confinement should be required to bathe and put on clean clothing throughout and should also be given a haircut and shave. They should then be brought to the mast and formally released by the commanding officer, who can appropriately say something like this: "Well, Jones, you did so and so and you have had to be punished for it. Now that your punishment is over, just remember that the slate is clean and you can now make a fresh start."

Formal release from expiration of confinement or other punish-

ment by sentence of a court-martial, and especially upon completion of periods of probation where months have elapsed since offense, trial and sentence, can well be dealt with in a similar manner. It would seem to be helpful to a man completing his term of probation to be told that entry to that effect will be made in his record.

HONORABLE DISCHARGES

Men entitled to honorable discharges are due to receive some attention above and beyond those who are only entitled to ordinary discharges. Men receiving dishonorable, bad-conduct, and undesirable discharges are usually read out of the service before the assembled ship's company. It would seem that the least that can be done for men entitled to honorable discharges is to see that they receive their honorable discharge certificates and honorable discharge buttons from the commanding officer himself. The commanding officer may well say something like this: "Well, Smith, you have completed your term of enlistment and are about to be discharged—you are to be congratulated on having successfully completed your contract with Uncle Sam in such a way as to receive this honorable discharge certificate which I now hand you—and your honorable discharge button, which you may well be proud to wear."

The man may then be asked what he intends to do—if he says re-enlist it is usually practicable to say, "We'll be glad to have you with us (or in the service) again." If he says that he is going to make a try at it in civil life, suitable comment can be made, as: "Well, Brown, we all wish you every success and every good thing in life. We all expect, and feel sure, that if Uncle Sam should say he needs you at some time in the future, you will be prompt in returning to the service—and we will all be glad to see you."

Such a little "ceremony" takes only a moment or two of time but it would seem certain that such considerateness will loom large in the memory of the man so dealt with, that his recollections of the service will be colored by the manner of his discharge, and that the benefit to the service will be appreciable.

ARGUMENTS

A great number of reports made by petty officers and others in authority will be found largely to have been carried into the "report stage" as the outcome of an "argument." This is an all too prevalent practice that is destructive of discipline.

The petty officer is, or should be, right, and therefore must be taught how to stop the general tendency to engage in an "argument," even if the "arguer" is a free-born American citizen.

Probably as useful a method as any is the precept—and practice—of that trenchant saying of Theodore Roosevelt which runs somewhat in this way:

"Guarantee to every man his full rights—and exact from him the full performance of his duty."

DISCUSSION

A "Wrinkle or Two" in Handling Men

BY CAPTAIN E. J. KING, U. S. N.

CAPTAIN L. McNAMEE, U. S. N.—The question of the best method of handling men is always timely and one which in the past has received too little discussion by experienced officers. The opinion of a ship's officers and men as to whether or not they are getting a square deal from the Captain is directly reflected in the morale of the ship's company.

I am in cordial agreement with most of what Captain King recommends and will therefore confine myself to some points, on which I would be inclined to make reservations. I quote "men who are up for commendation, for swearing to claims, beneficiary slips and for similar reasons, should be dealt with before delinquents." Men for commendation yes, but the others should be seen by the executive officer at another time and place. If necessary the Captain can administer oaths better in his own cabin.

Mast should not be made tedious and tiresome with extraneous matters, but should be kept strictly to the object in view—to publicly reward the good and punish the wicked. The reward of the good is just as important as the punishment of the wicked, and it is important that those who have committed offenses should have before them as an example their shipmates, who by especially meritorious actions, are receiving on that account the personal consideration and recognition of the Captain, which the others are denied only by reason of their neglect, delinquency or comparative inefficiency.

Enlistment records have a column for record of offenses and meritorious acts, but if one examines these records in nine cases out of ten, to be conservative, nothing appears but offenses. The "meritorious mast" is just as important as the "punishment mast," and the reason for a meritorious entry should be as carefully inquired into as the nature of a delinquency. Fulsome praise as well as unqualified condemnation should be avoided in serving out even justice. The "meritorious mast" was given a thorough trial with great success under Admiral Wilson when he had command of the fleet.

I agree with the writer about the abomination of foul language, but the resort to extra legal punishment such as washing out the mouth, etc., would be rather inconsistent with the recommendation of a previous solemn recital of the punishments that may be awarded by a commanding officer.

Nor do I agree with the advisability of giving "lookout" duty as a punishment. Any duty prescribed as an extra duty for punishment has the effect of lowering the standard of that duty, whereas a lookout should be

impressed with the great importance and responsibility of his post. Extra duty is always a problem, but in my opinion, it should be confined to extra and unusual cleaning, of which there is always necessity on board ship.

In regard to the reading at the mast of the Articles for the Government of the Navy there may be special cases where it might be advisable, but if made a matter of routine it would soon degenerate into a meaningless formula. It should be done once a month with great formality at a general muster. Few men have ever doubted or questioned the right of the Captain to punish and such technicians are usually sea lawyers that know the regulations better than the old man.

The practice of putting men on probation is an excellent one and works well in practice. It is best, however, to apply it when the ship is off on a cruise away from home ports. That is, where it is reasonably sure that the man will have an opportunity to serve out his probation and not be transferred to another ship where a new transgression could not bring about punishment for the old offense.

There is one point I would like to emphasize and that is in hearing cases at the mast everything should be done to help the man in his own behalf. Whether his case is good or bad he should be encouraged to get it all off his chest. If the Captain sympathizes with him and really makes out a better case in his defense than the man could do himself, then he is sure when the punishment is assigned that the Captain was at least not prejudiced against him. Any man who leaves the mast with his story locked up and rankling inside of him has been permanently injured and not benefited by his punishment.

The greatest problem with which Captains have to contend is what to do with boys that are reported as *worthless*. In very few cases is this verdict a just one. If the boy is physically or mentally defective he should be discharged, but most cases are due to poor handling and neglect of personal attention on the part of division officers. The best thing to do in cases where discharge does not appear warranted is to transfer the boy to another division. If this fails to effect improvement he should be placed in a "preparatory squad" under the constant supervision of a chief petty officer. This squad should be a permanent working party with separate mess and distinct from all other divisions. They should be required to turn out one-half hour before reveille, bathe, put on clean clothing and turn to. They should have daily bag and bedding inspection and be exercised and instructed constantly until they are recommended for return to their divisions. By this method I have seen the most hopeless characters transformed in a couple of weeks into the most valued men of a division.

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LETTERS OF A RETIRED REAR ADMIRAL TO HIS
SON IN THE NAVY

BY REAR ADMIRAL A. P. NIBLACK, U. S. N.

LETTER No. 13

FRENCH FINANCES. FRENCH CULTURE. FRENCH
"KULTUR."

Hope Farm, Long Island,
January 5, 1923.

Dear Son:

In your letter from Oran, Algeria, you say that, since your visit to Tangier and Morocco, you have become deeply interested in French North Africa. To me it is a real land of romance which, although overrun, in turn, by the Phoenecians, the Romans, the Byzantine Greeks, the Teutonic Vandals, the Arabs, the Moors, and the Turks, still retains the primitive character stamped on it by the Berbers, the original inhabitants, in historic times, of this rich and vast area and the most considerable part of its present population. In the Middle Ages, Spain, Portugal, Denmark and Holland seized upon and subsequently relinquished various areas in Africa, but geographically and ethnically North Africa has not only been cut off from Central and South Africa by the Great Sahara Desert but by the slave trade, and has been cut off from Europe by the struggle of the Moslems against Christian Europe. Curiously enough, the slave trade helped to isolate Central Africa and the crusade against the slave trade was the cause of opening it up.

The opening of the Suez Canal in 1869, following Dr. Livingstone's explorations and crusade against the Arab slave dealers, started a great scramble in Africa; with the Belgians in 1876, in the Congo; the Germans a few years later in the west and east;

and by British chartered companies in the south. By 1891, Africa had been portioned out among the European powers and only Liberia and Abyssinia remain as independent countries. Missionaries were the advance guard; then followed the British and other trading or chartered companies; then "Spheres of Influence"; then annexation. Exploitation has taken the place of colonization, but it remains for those who control them to face the problems of the relations between the white and the black races. France has been particularly clever in this respect, for the natives are fast educating themselves and beginning to feel a real sense of race consciousness.

The Berber stock constitutes one-half the population of Tunisia, three-fifths that of Algeria, and two-thirds that of Morocco, and this is due to the conformation of the Atlas Mountains, whose two parallel ranges traverse the whole of French North Africa from the Atlantic region to Cape Bon. Whenever their country has been invaded the Berbers have taken to the mountains or to the great Algerian plateau which lies between the Mediterranean and the Saharan ranges. The average height of the Atlas Mountains in Morocco is about 10,000 feet but they taper off in height toward Algiers and Tunisia. The Berber stock is, therefore, in direct proportion to the heights of the mountains which have given them shelter in days of peril. These Berbers are close kin to the European races, blue eyes and light hair being prevalent, and are distinctly an agricultural people, not being, therefore, nomadic except as to pasturing their flocks. The Moslem religion has been forced upon them by the invaders, but they remain monogamists. Honest, religious, industrious, war-like, and frugal, France has learned to conciliate them in every way. She blundered grievously in her conquest of Algeria from 1830 on, but is making no such mistakes in Tunisia and Morocco. These Berbers are divided into three stocks, the Kybales, of Algeria, the Shulahs, of the uplands and mountains, and the Tuaregs of the south Atlas slopes of the Saharas. There is also, in North Africa, a mixture of Arabs and Berbers, one-half as numerous as the Berber stock itself, but that is another story.

You say that you were astonished to find Oran a city of 120,000 inhabitants, connected by rail with Casablanca on the Atlantic to the westward, and with Tunis to the eastward, and

with a harbor long since outgrown by the commerce of the port but now being enlarged, new harbor works being constructed a short distance from it. You tell me of meeting some of my former friends at a *vin d' honneur* given by the Commanding General at the Officers' Casino, and of seeing a company of the Foreign Legion and troops of Spahis, the native cavalry, with their picturesque turbans and burnouses. The French have cultivated soldiers in North Africa as we have grown corn in America; but, for all that, France with her army of 800,000 soldiers with the colors today, is not really militaristic, nor imperialistic, but only hoping to keep her place as a first-class power in a world shattered by the clash of rival forces. France has the spirit and the courage, but lacks guarantees for her security and, above all, lacks financial stability. I am no financier, but her financial position today resembles a great lighthouse of civilization whose foundations are being pounded by the heavy seas. Can she stand up against it?

Our national debt is less than ten per cent and Great Britain's less than fifty per cent of the respective pre-war national wealth, while that of France is fully seventy-five per cent. The national debt of Great Britain is four times and that of France five times our own. Due to the repatriation of Alsace-Lorraine; due to the millions of dollars poured into France by British and American troops during the war; and, due to the wonderful thrift of the French people, her national wealth is now estimated at fifty-seven billion dollars. If we compute in gold francs at .193 her financial position is as follows:

Internal debt	\$44,800,000,000
External debt	6,800,000,000
<hr/>	
Total debt.....	\$51,600,000,000
National wealth	57,000,000,000
<hr/>	
Present worth	\$ 5,400,000,000

France owes the United States three and one-half billion dollars and owes Great Britain a little over three billion dollars, but her internal debt, in paper francs and at the present rate of exchange, is only forty per cent of the amount given in gold francs, and her present worth is really about twenty-five billion francs. While Great Britain has balanced her budget and reduced her expenses,

and taxed her people heavily to do so, France has seemingly made few economies in administration, and has resorted to loans to supplement her income. For the four years from 1919 to January 1, 1923, she has borrowed one hundred billion francs, which, by a fiction, is charged to "recoverable expenditures," from German reparations. But is it "recoverable?" All that Germany has so far paid France is \$380,000,000, equivalent to five billion paper francs, while France has borrowed, at interest, ninety billion francs for the one item of repairing the devastated regions. In other words, Germany has so far only paid *one year's interest on French reparation loans!* France's budget for 1923 well illustrates her desperate financial situation. It calls for over twenty-three billion francs. Her revenues will produce only nineteen billion francs, a deficiency of four billion francs. This makes no provisions for pensions, repairs to devastated regions: viz., expenses chargeable to fictitious "recoverable expenditures." In the year 1922 France has had to borrow twenty-one billion francs over and above her budget and, in 1923, there is no reason to believe it will be much under twenty billion. In other words, the national debt of France, which was forty-one billion *dollars* in 1919, is now nearly fifty-three billion and mounting every day.

By the agreement of May 6, 1921, France should receive \$16,336,000,000 reparations from Germany. As previously stated, she has, so far, only received less than two and one-half per cent of this amount. France is not able to balance her budget on account of four factors: (1) The cost of reconstructing her devastated regions, which she is making loans to meet; (2) The development of her colonies, which she would like to make loans to meet; (3) The repayment of her debts to Great Britain and the United States, which she has made no attempt to meet; and (4) The expense of her vast army and modest navy (national defense) which amounts to five billion francs annually. If she could collect fully from Germany (1), (2) and (3) would be settled. But German reparations have been the football of politics in the Allied countries, and not been in the hands of business men. There has been too much hate and too little trust; too much threatening and too much evasion; too much old-fashioned secret diplomacy and too little of the Golden Rule.

You will be made to realize that there is much subtle propa-

ganda in Europe, which puts the United States in a bad light because we very justly and wisely refuse to cancel the Allied debts, but whether we cancel them or not we will be the goat just the same. For instance, if France's external debts, (3) above, were cancelled, (1), (2) and (4) would continue as now, and that would mean we would never be paid anyway. In fact, we are lucky if we do not have to pay the Allies the reparations Germany seems unable to pay for *that is certainly what it amounts to if we either cancel the debts, or the Allies are unable to pay.*

If we look into this debt question, even superficially, we will see how unjust and how futile any question of cancellation is and would be. As it is now, we simply hold the Allies' I.O.U.'s which have not yet been converted into bonded debt, bearing interest, as agreed during the war, and the question of accrued interest has, therefore, not yet been adjusted. Our people have not yet been required to redeem the Liberty bonds that were issued to raise the money to loan to the Allies, *but are being taxed to pay the annual interest. That means we are ourselves now paying the interest on the Allied debts.* They spent these billions of dollars we loaned them, but we also spent twenty-two billions of dollars on our own account for our own expenses in the war. For instance, since the Armistice, we have loaned Great Britain \$576,000,000, Italy \$629,789,000, Belgium, \$176,834,467, and France \$1,027,427,800 in addition to the actual war loans. If we forgive even this much to them we shall, to all intents and purposes, be paying the German indemnity. The money the Allies borrowed during the war on I.O.U.'s and not bearing interest, was spent by them for (1) necessary current military supplies; (2) food bought in the U. S. A. and sold to their several populations; (3) raw materials for manufacture bought in the U. S. A. and sold to private manufacturers for the purposes of sustaining trade; (4) redeeming the loans made in the U. S. A. before we entered the war, from private sources, bearing interest, which thereby transferred the payment of the interest from the Allies to Uncle Samuel, and (5) post-war relief similar to above, reconstruction and trade revival. Besides that, the Allies have profited enormously from purchases from us, on I.O.U.'s, of war material, construction, and material remaining behind in Europe. We have been Santa Claus! As a well-known British officer said

to me, "We did not need your naval and military forces, but only your money." During the war we spent enormous sums in sustaining the value of Allied exchanges by purchasing their money at a fictitious and fixed value, much above what it was in neutral countries, with which to pay our officers and men in Europe and all other incidental expenses "over there." I figure that I got twenty per cent less pay on that account. On the other hand France and Belgium paid heavily in devastation wrought by having the war fought on their soil, but England is suffering heavily from unemployment and trade losses. So are neutral countries paying, and so is the whole world paying except the Far East.

Great Britain has announced her intention of paying her indebtedness to the United States. What she has so far paid is principal, and would not amount to one per cent of one year's interest on her debt. Our taxpayers are paying part of the interest now on Great Britain's debt to us. You may think that we appear in a bad light in not accepting Great Britain's proposal to cancel indebtedness to herself, amounting to sixteen and one-half billion dollars, if we would cancel the ten and one-half billion dollars of Allied indebtedness to us, but when you put it down on paper it appears in a different light. In the first place she owes us \$4,250,000,000 and in the next place, in the sixteen and one-half billion dollars owed to her is included an item of \$7,250,000,000 which she claims as war indemnity from Germany, while we have waived all similar claim on Germany. Her proposal, therefore, really figures out like this:

Great Britain offers to forgive.....	\$16,500,000,000
Her uncollectible German indemnity is.....	7,250,000,000

Allies of Great Britain owe her.....	9,250,000,000
We forgive Great Britain what she owes us.....	4,250,000,000

Great Britain forgives other Allies.....	5,000,000,000
It is proposed we forgive the Allies.....	10,500,000,000

We sacrifice more than Great Britain by.....	5,500,000,000
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(In other words it is the same old thing. Our taxpayers would practically pay the German indemnity.)

If anyone abroad tells you we are cold, calculating, money-lending, please tell them Europe is unreasonable. The answer

to the economic crisis in Europe is (1) every country must balance its budget as the first requisite of financial stability; (2) unless something is done to check the economic disaster which threatened Europe following Armageddon, Europe faces a further peril as the Asiatic and Moslem powers have unlimited man power, undeveloped resources, and practically no national debt; (3) the Allies cannot pay their indebtedness to us for many years to come, and we must therefore practically help pay the German indemnities, and should take a hand in the German reparations problem, for it is merely piling up burdens on our own taxpayers.

To rebuild German industries with American capital would be to throttle the growing trade of the Allies, but Germany can only pay if thoroughly taxed. Taxation in any democratic country is an extremely difficult process, because the taxpayers are also the voters. Taxes cannot be collected economically from Germany by military force, and the answer is, therefore, that Germany must be given economic aid, and her republican government must be stabilized, because a change of government means repudiation of reparations. Germany must be bound to a council of nations, and all must face together the growing problem of Asia and Islam, before it becomes a real vital problem. We are all heading straight for disaster, by a policy of greed which makes concerted action impossible. "A trace of oil" may be found nowadays in diplomacy.

The fuel question is more important than appears on the surface. The lack of coal in France has made it difficult for her to exploit her iron deposits, and handicapped her seriously as a world power. Increase of population comes only with increase in wealth through manufactures, trade, and commerce. Resources determine population. France was the richest and most populous country in the world, before modern inventions demanded coal. There is no lack of enterprise in the French people; they have shown marvelous administrative ability in their colonies; and France's economic handicap makes her seem less progressive than her more fortunate neighbors. Civilization owes too much to France to see her drop back now.

FRENCH CULTURE

The conquest of France by Julius Caesar cost millions of lives and a long, hard struggle, but he really civilized the French. He built great systems of military roads, established an administrative system operated by the natives, and raised large levies of troops to fight for Rome. In 800 A.D., when Charlemagne saved Western Europe and became the Roman Emperor, his sons were not able to agree among themselves, and, by the Treaty of Verdun in 843 A.D., Germany and France, until then united, became distinct kingdoms. With the breaking down of the feudal system, the French spirit of criticism, of inquiry, and of revolt against injustice asserted itself. Under such able ministers as Richelieu, Mazarin, and Colbert, France enjoyed order, good government and unity. But it was the Caesars in the form of Louis XIV and Louis XV that wrecked France and brought on the Revolution. The French Revolution destroyed the exemptions claimed by the nobility and the clergy, established equality before the law, strengthened the rights of property, and made democracy possible in Europe. The wars of Napoleon, and the two wars with Germany, have staggered France and led to her economic rather than spiritual decay. With a small population, gigantic war debt, and the bulk of her coal mines and most important industrial districts completely and deliberately ruined by the Germans, France is entitled to more than the sympathy of her Allies.

In her philosophy, science, oratory, military leadership, drama, painting, sculpture, and architecture, she has adhered to the classic tradition of Rome. As a recent writer says: "That tradition stands for method, careful attention to form and design, a reliance upon reason, a search after comeliness without extravagance . . . and discipline, or at least discipline in all respects save the political." British civilization across the Channel has always lagged behind that of France, because it has not been brought in direct contact with the Continental influences to which France has been subjected. In England, William the Conqueror is somewhat of a tradition. To be sure he built parts of the towers at Windsor Castle, and London Tower, but, in France, at Caen, he and his Queen are buried in separate cathedrals built for this purpose. The tapestries at Bayeu were woven by the hands

of his consort and her ladies-in-waiting, and depict the histories of his conquests and at Dives in the inn from which he sailed for England. The history of France, contemporary which English history, is preserved with great realism in the chateaux and monuments, which seem all but alive with the spirit of her leaders.

In other words, my son, I am trying to tell you that I regard French civilization, culture and achievements, as superior in many respects, to those of the British, from which we have drawn our inspiration, so do not make the mistake that too many of our British cousins make of "overlooking" the French people. France was fighting for civilization against barbarians, while missionaries were lighting the torch in England.

As Americans, we make pilgrimages to the shrines in England which commemorate the great events in British history, which we share from Colonial days. After all, American colonial history is largely only a record of English enterprise on American soil, and merely a phase of European civilization under a changed environment. The differences in the early history of the various colonies in New England, New York, Virginia, and the Carolinas, were due largely to the differences in the social habits and ideals of the different European stocks from which they emigrated. We have inherited the idea that British art, literature, and drama are necessarily the highest type. Our own great contribution to civilization has been in the art of government. The world has everything to lose by disaster to France, and historically we owe too much to her in attaining our independence, and in embodying her democratic ideas in the American Constitution, to let her go by the board now,—and we never will!

FRENCH "KULTUR"

I am not trying to tell you any secrets. A secret is what you tell someone else not to tell, because you promised not to tell it yourself. I am merely trying to give you a point of view, and it really may not be the correct one. My idea is that French surface politeness, mixed with American directness, is the best solvent in international relations. Politeness puts the other person on the defensive, and directness keeps him there. Where the British make a mistake is that, while their intentions are always admirable, they seem embarrassed for fear someone will thank them

for it. Personally, I am not *pro* or *anti* any people. I admire the French, I respect and like the British, I understand the Germans, and I am secretly fond of the Turks. It is not differences in morality but differences in "kultur," which dig chasms between peoples. I do not mean culture, for that is only the polish, or trimming. "Kultur" applies more to a combination of ideals, traditions, customs, forms of government, art and literature.

One of the fashions of war propaganda against the Germans was to denounce their "kultur." What was really bad was Prussian junkerism and Prussian self-assertion. The Germans are really a great and admirable people, stupidly tied to the military chariot wheel, which has all but dragged them into ruin. In the war it was the Bavarian and Prussian troops who were the offenders against the laws of war. The Rheinish, Hanoverians, Saxons, and other troops were comparatively docile. The revolt against their leaders, after the Armistice, was also largely Prussian and Bavarian.

I have spoken highly of French art, literature, and civilization, but I cannot say so much for all her "kultur." Medieval France is not as far off as it should be. In spite of intense devotion to France against a common enemy, there is intense jealousy of individual town and departmental rights, as against national interests. France is the most bureaucratic country in the world. At the root of this is the endless surveillance of internal customs. In all the large cities there are from three to eight men on duty day and night to collect octroi and petty taxes on every vehicle, which, excepting a street car, must stop for at least a casual inspection and the purchase of or showing toll tickets. The amount collected hardly warrants the expense of this particular form of bureaucracy, and the loss of time and annoyance certainly do not. All through France too many people are employed in government business and the number might well be reduced, as is now being done, to help balance the budget. France's finances are antiquated; the banking system is especially so. In many communities there are no banks at all, and it takes endless time and formalities to cash a check. There is a shortage of small change all through France, and local coinage is not good outside of a very narrow area, not to mention the loss by exchange in taking it to other localities. After being in France for awhile you get

the idea that life is entirely a local issue. But anyone who makes the mistake of thinking that Paris is France has only to ask a politician why the French people cannot be taxed more heavily and why they are pressing Germany so vigorously.

The fact is, peace is so difficult to make, because the whole world is reaping the harvest of the war propaganda. All the ill deeds of the enemy in the war were grossly magnified, and none of the noble or generous actions were published. The "Terrible Turk" is unrecognizable when you meet him personally, as he turns out to be such an improvement in morals and manners over anyone else in the Near East, that you have to pinch yourself to make sure you are not dreaming. The French people, with their passionate hatred and vengeance against the Germans, are making future Huns of those whose hearts were not in the Hun business during the war. If the world only realized it, the real Hun is the Bolshevik, and the *real* danger is that French pressure may drive good, honest Germans into Bolshevism. As a matter of fact there are proportionately quite as many honest, moral and upstanding Germans in Germany and Turks in Turkey, as there are commendable citizens in any other country in the world; and we ought to be careful not to make it impossible for them to retrieve the position which most of them have been put in through the fault of their rulers. On the contrary, the Allies and the United States should strengthen the hand and encourage the stability of republican institutions in Germany, as the best guaranty of peace and goodwill. We all face the growing menace of the Asiatic peoples, numerically, economically, and potentially. We must eventually face it, shoulder to shoulder, with Germany on our side. Judaism and Bolshevism, with their cult of internationalism, are also of Asiatic origin, and tend to corrupt the loyalty of citizens, thereby endangering the stability of institutions. The class war now going on in the Allied states, the United States, and the ex-enemy countries is sufficiently ominous not to make it worse by driving Germany into Bolshevism.

We are stirring up trouble for ourselves in the United States and in the world by our "kultur" on the "color line," which negro slavery left with us as one of its heritages of evil. France is trying to compromise on the color line and England is on the fence. One-third of France's army are "natives" with no consciousness

of it unnecessarily thrust upon them. Before the war Germany was making a mess of its color problem by injudicious handling, just as France has made unnecessary trouble by the injudicious handling of the same problem on the Rhine. We are right in America as to the evils of race mixture, but the question should absolutely stop there. In all countries in the world the different races may live side by side in Christian spirit, but the rising tide of color must be met as a problem of higher civilization all around for everybody.

The case against Germany economically is that, whether or not she started the war, she was defeated. She has no external debt, except reparations which she must pay as war indemnity. She has no reconstruction, as she has no devastated regions. Her external debt is to her own people, and in paper marks it is inconsiderable as compared with what France is facing financially. As previously stated, France has spent ninety-three billion francs of borrowed capital on her devastated regions, which Germany owes her, as she has only paid France one and one-half billion gold marks. Germany must pay, and to the extent Germany either must pay, or is made to pay, depends the future of Europe as at present constituted.

The case against France is, she has not balanced her budget for current administrative expenses, and were Great Britain and the United States to promise her security from attack by Germany, owing to the instability of her politics, it would only encourage her in dangerous diplomatic adventures, for France is addicted to the vice of secret treaties. Her policy of hatred and vengeance toward Germany, while natural enough, is also a source of danger to Nordic civilization and its predominance in world affairs. We must keep Germany with us or Bolshevism will be the next step, leading no one knows where.

What France asks is reparations from Germany for material damages, and security from future attack. The French feel that their claims are too obvious to need explanation, and their pride and reticence prevent them stating their case properly. France is not militaristic, and she is spending annually very much less for the maintenance of her national defenses than either Great Britain or ourselves. She gets more for her money because she

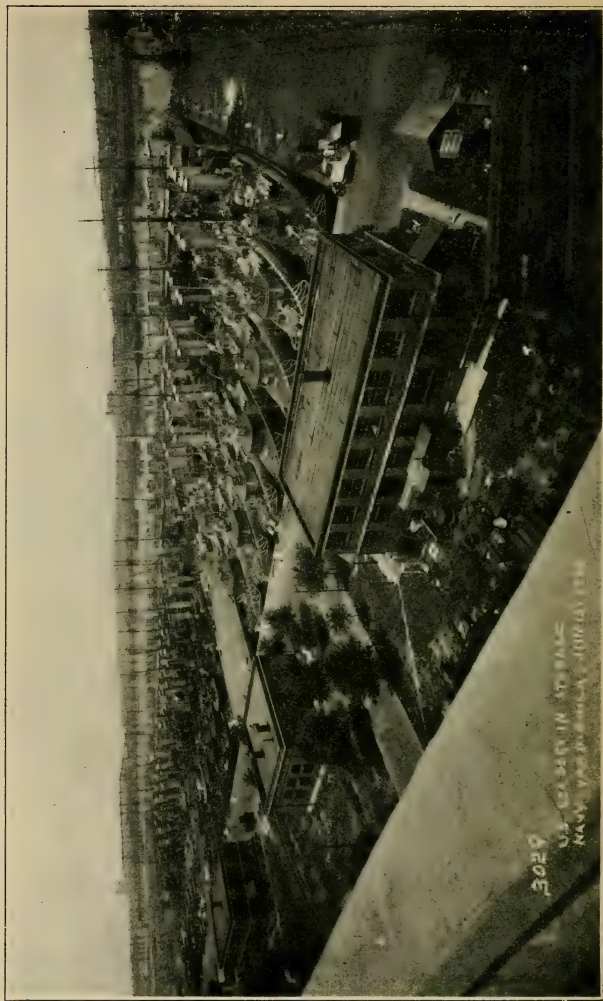
has conscription, which she has recently reduced from three years to eighteen months.

The case against us is, we have stayed out of the European muddle very properly up to the present time, but now we must go in to protect ourselves, and to avoid economic chaos in both France and Germany.

My idea of remedying the economic situation in Germany and providing her with a new currency to replace the almost extinct mark, is for Great Britain and the United States to establish the value of the franc at sixty to the pound, and make French currency the medium of exchange in Germany. This could be accomplished by Great Britain and the United States loaning the German government, municipalities and large companies, a total of some billions of francs; and making reparations payable in francs. This would improve both the value of the pound sterling and of the franc. Reparations should be payable in francs, independent of the relative value of the franc. This would be almost like making reparations an internal debt instead of an external one. Strict measures would have to be taken against counterfeiting French paper currency. If this scheme is like lifting yourself by your boot straps, then I am very much mistaken. What do you think of it?

Your affectionate

DAD.



U. S. Sea Dogs in storage. Navy Yard, Philadelphia, June 15, 1922

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DECOMMISSIONING DESTROYERS AT
PHILADELPHIA

BY LIEUTENANT P. V. H. WEEMS, U. S. NAVY

For sufficient reasons the Navy Department sent out an order on February 18, 1922, to proceed with the decommissioning of 157 destroyers, leaving a total of 123 boats in full commission. Of the destroyers to be laid up, 90 were to remain at Philadelphia. On March 20 the first boats left Charleston preparatory to laying up at Philadelphia. As a preliminary step as many torpedoes and stores as possible were transferred to the active boats at Charleston. As the huge task of decommissioning so many boats had never before been undertaken, it was a wild guess to say definitely when the boats would finally haul down the flag.

An estimate was made by the yard stating the number of boats that could be accommodated at one time without confusion. The program called for the boats by administrative units. The first ones to arrive were boats of Squadron One under the command of Captain Yancey Williams, which reached the yard on 24 March. Once at the yard, the race of decommissioning began. "Race" is the correct word, since the instructions called for the date of decommissioning all the boats as June 15.

The first day at the dock was spent in sending out all ammunition, boats, anchor chains, and other heavy items. Then at the first opportunity the boats were towed to the back channel, or reserve basin, to complete the work. Each boat required about a hundred gallons of paint, about a ton of paraffin wax to seal up the sea valves, fifty pounds of rust preventative to lay up the torpedo tubes and guns, and finally several barrels of unslaked lime and several barrels of rust preventative with which to lay up the machinery of the engineering department. Multiply these items by 90 and some idea can be had of the enormous amount of

stores which had to be supplied by the yard Supply Department. Unavoidable complications arose. As the quantity of approved rust preventatives on hand was insufficient, a substance resembling vaseline was issued instead. After some of the boats had laid up the main engines with this substance it was found by test to be unsuited for the purpose for which used, and machinery laid up with it had to be cleaned to the bare metal and coated with approved rust preventatives. This entailed an enormous amount of extra work.

On several boats the main injection and discharge valves would not close watertight, and the paraffin could not be placed. This difficulty was overcome in various ways. On one ship, two three-ton chain falls led from the boat alongside to heavy wire pendants passed underneath the ship to be heeled, aided by a similar fall led from the searchlight tower to the boat on the other side, heeled the main starboard valves clear of the water. A man was then sent inside and adjusted the gate valve which had become cock-billed in the groove, and in a few minutes the valve was closed.

Practically all linoleum in all the boats was taken up, the deck cleaned and scaled and then red-leaded. Some of the decking under the linoleum was in fair condition, and a department order came out to the effect that linoleum was not to be taken up where the deck underneath was not suffering. However, this order came too late to save much of the linoleum as most of it had already been taken up.

Under the metal furniture bad rust and scale were found. Another place which seemed to have been overlooked in many of the boats was the bulkheads near the water line in the boiler and engine rooms. It was found that serious scale had developed under the heavy coats of paint.

The general plan in laying up a boat was to have sub-inspectors pass on each compartment and on each piece of machinery before the final inspection board came around. In this way many of the minor defects were corrected before the final board inspected the ship. A compartment would not be passed until it was placed in almost perfect condition, unslaked lime placed in it and the compartment sealed up water-tight if possible. All openings through which water or moisture could enter were sealed, metal covers put over the stacks, every part of the ship got its proper

preservative for machinery and bare metal, and suitable paint for the other parts of the ship.

About two weeks before the ship was due to go out of commission the crew was quartered in barracks in the yard and messed at the receiving ship, in this way gradually removing everything in the line of food and stores from the ship. One of the gruesome results of moving all food from the ship was the rat famine. The rats worked their way about the ship behind the metal sheathing. Of course, there was no access through the water-tight bulkheads, yet it is difficult to explain how rats and mice made their way from one compartment to another. When the lack of food began to have its effect on the rats they turned to on leather book-bindings, paper bindings for the glue in them, then on such items as linen collars for the starch in them, on tennis racquet strings, and almost anything else from tin cans to shoes. Finally when the compartments were sealed for good Mr. Rat was caught in a death trap. An inspector opening a compartment a few days after a boat was decommissioned saw a rat in such distress from hunger that it made scarcely any effort to get out of the way.

Unexpected details would come up the last few days, which could only be overcome by extra work, if the boats were to get out on the date set. In these cases the men on many of the boats worked through meal hours and into the night several days before the flag came down. The ship spirit among the men was excellent and only a person who personally saw the amount and kind of work can appreciate what was done. There were many hardships and few comforts, yet nearly every person who helped to put a boat out of commission will say that valuable experience was gained, and that work on another ship will come easier from the knowledge gained in putting these boats out of commission.

At first almost everyone thought it was a pity to lay up these fine boats, and probably thought they would be a total loss. After seeing the way they are laid up, one is ready to believe they will be ready for a frolic or a fight for several years to come in case only reasonable attention is given them. A captain in the Construction Corps estimates that they will be serviceable for fifteen or twenty years to come if reasonable attention is given them. His plan for upkeep of the boats is to have an officer in charge of four

officer inspectors who will each inspect a boat a day, sighting every compartment in every ship once each month. Blanks will be filled in on each compartment, and the officer in charge will make rounds at random to check the inspection made. Any *defects* noted are to be corrected by a force of one hundred fifty yard workmen who will work under the supervision of the inspectors.

The boats are sandwiched in between the slips two lengths deep with bows overlapping, and with the entire space between the slips filled with boats. The result is that the group of boats are so closely packed that there is practically no motion even in hard blows. Also the fresh water in which they rest and the ample storehouses in the Philadelphia yard make this an ideal place to keep the boats which cannot be maintained in full commission. At this writing, July 17, 1922, more than 80 of the 90 boats are out of commission.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE NAVAL ACADEMY OF TODAY
AND ITS MISSION

BY LIEUTENANT COMMANDER MAHLON S. TISDALE, U. S. NAVY

THE MISSION

"To mould the material received into educated gentlemen, thoroughly indoctrinated with honor, uprightness and truth, with practical rather than academic minds, with thorough loyalty to country, with a ground work of educational fundamentals upon which experience afloat may build the finished naval officer, capable of upholding, whenever and wherever may be necessary, the honor of the United States; and withal giving due consideration that healthy minds in healthy bodies are necessities for the fulfillment of the individual missions of the graduates; and that fullest efficiency under this mission can only be attained if, through humane yet firm and just discipline, the graduates carry into the Service respect and admiration for this Academy."

The Naval Academy has passed through many physical transformations since its inception in 1845, and it requires some daring, in these days of progress, to attempt to visualize the future. But even with the reduction of armaments, it is reasonable to assume that the Naval Academy of today will be the Naval Academy of the future—for several decades at least.

In the evolution from which resulted the present Naval Academy, the greatest single increase in capacity came during the World War when the plant was increased to its present size. By duplicating the wings of Bancroft Hall, the quartering capacity was about doubled. The Hall can house, in its four wings, two thousand forty midshipmen, with two in each room. Dur-

ing the war the appointments were increased to five for each Congressman, with twenty for the President and one hundred for the Secretary of the Navy. As a natural result last year saw a regiment of 2,431, the largest in the history of the Academy. There are 2,396 at present.

Such regiments are too large. They necessitate berthing three midshipmen each in some of the old "Youngster" rooms, and as many as four in some of the "first class suites." Manifestly such crowding, though necessary in but a small percentage of cases, is unsatisfactory. Last year a bill was introduced in Congress to reduce the number of appointments to two for each member of Congress, and proportional reductions among the other appointing powers.¹ This bill has not become law. A happier choice in reducing would be four. There are several good reasons for not reducing below that number. Such a drop would furnish a regiment of about two thousand which would permit the existing plant to be run at maximum efficient capacity. The attrition in commissioned personnel in these times of treaty navies is high. This year it may run as high as two hundred fifty. If the Service is ever to fill existing vacancies, and keep step with attrition as well, we will need about four hundred graduates each year for some years to come. Further, by graduating more than are needed for the Service, the navy can select only the more apt for commissions. Perhaps the Government cannot afford to run the Academy at a maximum, solely to permit choosing the graduates, but there is another side.

The graduates who are returned to civil life will be the nucleus of the finest sort of a reserve. The opportunity for an education will be granted to many young men who might be denied an education otherwise. Four years here cannot fail to instill much Americanism, as well as good character, into the graduates. They will be returned to civil life better citizens in every way. The

¹ A clause in the Annual Appropriation Bill for the Navy making appropriations for the fiscal year ending 30 June, 1924, provides "That no part of this appropriation shall be available for the pay of any midshipman whose admission, subsequent to the class entering the Naval Academy next after the approval of this Act would result in exceeding at any time an allowance of three midshipmen for each Senator, Representative and Delegate in Congress . . ." and goes on to say that existing laws regarding appointments are not repealed. Whether this clause will be carried in subsequent Appropriation Bills is a question.

overhead expense increases only moderately per capita, with a regiment of two thousand, as opposed to one of fifteen hundred. Naturally the pay and the cost of the rations depend directly upon the number of midshipmen. The money could be spent much more unwisely.

These reasons are sound, and contain most of the arguments customarily advanced. Little opposition to them has developed, and there has been no refutation. The Government has many farms for moulding and developing live stock. Surely a school for the moulding of humans into good citizens is a wise investment.

As has obtained for years, the midshipmen are drawn from all walks of life. Yet even the poorest judge of character cannot fail to see that the average *candidate* compares most unfavorably with the average *first-class man*.

Recent years have witnessed an increasing interest in what one might call practical or applied psychology. The war focused thought on this feature of leadership. No officer will deny that the ability to lead men is an essential characteristic of a good officer. Yet for years each coming generation has had little guidance in this regard. For our particular form of career, we have had instilled all sorts of knowledge about all sorts of machines, except the human machine. And without the human machine, of what avail are all of the others?

The press of war saw all kinds of men commissioned. Some with previous experience as executives, but more without it, became officers. These men, fired by the enthusiasm of war, patriotism, and personal ambition, sought written guidance—only to find that in the Service experience is, in truth, not only the *best* teacher, but virtually the *only* teacher. Training had to be conducted largely by word of mouth and by example. There were plenty of excellent works on war and similar subjects, but few on the fundamentals of leadership. All of this brought the realization that the graduates of the Academy were being sent into the Service, with possibly the essentials of command indoctrinated into them, but with little tangible advice or instruction in those practical methods, which the experience of generations had shown to be best suited to the situations a junior officer encounters afloat.

It is perhaps true that leaders are born and not made. But there are various degrees of skill among leaders. The Napoleons may perhaps have the God-given gift, but we cannot all be Napoleons. Nor can we wait for the presentation of the gift. Few there are who have it. Yet the rest of us must struggle along as best we can. We are in a career which is primarily one of leadership. The Service standards are of the highest. To meet this situation, a course in leadership has been introduced into the Naval Academy curriculum. And for the same reason, the mission of the academy has been reduced to writing, in the belief that a visible mission will crystallize thought on those features of the academic life which have the greatest bearing in fitting men to command.

Recent developments in warfare such as aviation, gas, radio, and communications have demanded, or are demanding, a place in the curriculum. But it is difficult to find the necessary time. The pace is already fast. The departments have been re-working their respective courses, cutting and pruning where possible, to make room for the newer subjects. The mission is to teach fundamentals, which grants plenty of authority for cutting—but there is much that cannot be cut. The new developments have caused no reduction in the importance of the old subjects. Most of them are in the line of additional information required of the naval officer, rather than a replacing of the old knowledge. Radio, for example, is of a continually increasing importance, but it does not relieve the officer of today from having a knowledge of signals.

To meet this difficulty, there appear to be only two courses open. Either we must come to the five-year course, or the entrance requirements must be so increased that a candidate will have had one year of college work prior to admission. The latter plan seems impracticable for several reasons. It would increase the age of admission, even though the actual requirements might remain unchanged. It would prevent many worthy young men from qualifying for the academy. It would probably not meet with the approval of the Congressmen, who are privileged to appoint the candidates. The present entrance requirements have, in the press from time to time, already been classed as difficult. As a matter of fact, they are not difficult, as

the results would indicate. The entrance requirements for classes entering in 1923 and subsequently, have been increased, but only up to college entrance requirements.

Now coming to the mission, it contains nothing new, but does express in black and white what the Academy is working for. This differs little from what has been taught for years, but it permits all to see at a glance what a high standard the service expects of its officers; and that, while scholarly attributes are essential, unimpeachable character is vital.

TO MOULD THE MATERIAL RECEIVED INTO EDUCATED
GENTLEMEN, THOROUGHLY INDOCTRINATED WITH
HONOR, UPRIGHTNESS AND TRUTH

Character permeates the entire mission. I cannot better express the necessity than to quote from a letter written last year by the present Superintendent to the Secretary of the Navy:

High standards of character are vital in a military organization. Men in other walks of life may trifle with the truth in everyday affairs and suffer little as a consequence. We cannot be so tolerant. The fundamental of an officer's value to the Service is his trustworthiness.

No one in the Service can amount to much without having pride in his calling, and pride in his own particular assignment. This is one reason why the mission sets such a high standard. Men are prone to be what their superiors think they are. The mission directs the thoughts of the young gentlemen of the regiment, as well as those of the officers, toward a target. The target involves honor, uprightness, integrity, and many other essentials. As the midshipmen respond to the challenge and indulge in introspection, each will see some of the dross not visible to others, and a thoughtful consideration of self, compared to the ideal which the Academy demands, gives a determination to meet the test. When it has been met, there comes the pride of success. Custom and tradition have always held ours to be an honorable calling. Ever since there have been navies, officers and men have been proud to wear the blue. At high standard set—and met—makes for satisfaction in one's work.

Pride is allied with self respect, without which no officer or man can succeed. A midshipman's word is not questioned. He is taught that he is expected to tell the truth; that less than the

truth shows him unfit; and, so far as the authorities are concerned, that what he says *is* the truth. This gradually cements into his character not only the habit of truth, but also pride that he is trusted, and his self respect is strengthened accordingly.

When the occasional misfit does enter, sooner or later he shows his true colors. The standard punishment for any offense of evasion of the truth, actual untruth, or other offense involving the honor of the individual or of the Service, is dismissal. The honor element of naval character must be unimpeachable.

It goes without saying that the academic course must be maintained at a high standard. There are at least two reasons for this. First, because academic education trains the mind to think, to reason logically, and to estimate correctly the countless situations which a naval officer is called upon to handle. Second—and this reason is not so widely understood—because a strenuous academic course instills a fundamental of naval character into the midshipman. This is the habit of working, and of working “on one’s own.” Our section room methods do not meet with the universal approval of the scholars of the country. Some of them prefer the lecture method. But there is no denying that four years spent in digging things out for one’s self breeds independence, and teaches the young gentlemen of the regiment to work, and to work hard.

Marks are a necessary evil. One might almost say that they are the curse of the course. They must exist not only to stimulate effort, but to permit some sort of reasonably just arrangement of the graduates on a seniority list. Any other scheme would make the arrangement haphazard.

A primary requisite in the character of the successful naval officer is obedience. One who cannot command himself cannot command others. Hence, for four years the midshipmen are taught self-discipline. Many of the academy regulations seem unnecessary to the thoughtless. But all have a purpose. The American character is essentially one of action. This action in the younger generation is frequently without regard for the rights of others; and is all too often without regard for the consequence. In short, obedience is not one of the prominent characteristics of the average young man. No officer can be successful who is disobedient. This involves loyalty, subordina-

tion, and several of the other recognized attributes of one who would succeed. Of course the primary function of most rules is for the orderly carrying out of a large and intricate organization, but regardless of the reason for the regulations, it is a fact that they do teach the novice that there are certain things that he may not do. They form the entering wedge, in the training of men for a life of self-sacrifice in duty's name. The orderly arrangement of the day teaches promptness, loyalty, attention to details, subordination to superiors, and obedience in general. An important part of the training in obedience is military drill—the so-called “drills of precision.” They form the habit of obeying an order exactly, at a definite time, and without question. Infantry drill, so far as a necessity for the knowledge of the subject is concerned, is not as important as is gun drill. But as a moulder of character, its value is incomparably greater.

Another important point now receiving much attention is how best to stimulate the efforts of the midshipmen. Every regiment has had a minority who shout vociferously that all they want is a “little old two-five.” While this claim is most often made by those incapable of garnering more, such statements to a certain extent are harmful to the rest. Most of us feel a wish that we could do it over again, and the feeling always carries the mental qualification that “I could pull my class standing up, now that I realize what standing means.” In other words each of us has admitted, at least to himself, that his present standing does not represent his best effort. The word “greaser” still carries the old stigma, and the midshipmen of today are no different from those of yesterday. To urge the regiment to greater effort, the attention of all hands was called to the value of class standing, and its importance in their career. Forming the habit of doing one's best is much more far-reaching than simple class standing; for learning to do one's best, on all occasions, is a fundamental of naval character.

In a further attempt to stimulate effort along those lines an order was published, explaining the value of service reputation, and encouraging the midshipmen to work now toward that goal; stating that the Superintendent will place a letter of commendation on the records of “those six midshipmen who, at the end of the academic year, will have contributed most by their officer-

like qualities and positive characters to the development of military spirit and loyalty within the regiment."

It has been said that too many first-class men leave the Academy without having heard the sound of their own voice raised in command. The midshipmen officers received plenty of training, while the "clean sleeve" had to go on board ship into a division assignment, with no experience in command beyond handling a section during a periodic detail. To equalize the opportunities of all first-class men—for after all, our major simple mission is to command—the present system of changing the assignments each month was placed in effect. All first-class men now wear a single narrow stripe around the sleeve; and in addition, the midshipmen officers wear the appropriate number of short stripes just above the class stripe. For the last three months of the year, selections are made from the entire first class, having in mind the record of each midshipman in his previous detail. The best are selected, and they wear the appropriate insignia of rank, the customary five stripes, four stripes, etc., all the way around the sleeve, in lieu of the class stripe. Each midshipman, under this system, graduates with the experience of having commanded a squad at least. This breeds confidence, in proportion to the responsibility which the size of the command has carried. Confidence is another fundamental characteristic of the efficient officer.

As another important step toward the moulding of character, an intensive educational campaign is being conducted to counteract the ease with which lenders of money, or credit, prey upon the midshipmen. The midshipmen have been told repeatedly, both orally and in writing, of the menace carried by the debt habit. An effort has also been made to interest their parents in this feature. One large firm has voluntarily agreed to solicit no life insurance from midshipmen. A Baltimore paper has published an editorial "Rally around the Admiral," commenting favorably upon the efforts being made to stamp out the debt habit. If the midshipmen can be made to see the foolishness of spending considerable sums on "grad" terms, they will not only have avoided forming a bad habit, but will join their first ships more cheerfully than where, as formerly in some cases, a year's pay is obligated to a human vulture.

WITH PRACTICAL RATHER THAN ACADEMIC MINDS

The midshipmen are taught to seek responsibility, and are given the necessary knowledge, that they may not fail to measure up. The course is essentially practical. An officer handling huge ships, big guns, intricate machinery, and high speeds, must have common sense, a quick acting mind, and the requisite knowledge.

WITH THOROUGH LOYALTY TO COUNTRY

Naval Tradition has an important function in developing loyalty to the Service, as well as to the Country. Young officers, though they may have unknowingly absorbed much of it, may scoff at tradition as one of the hobbies of the senile. Thinking men will admit, however, that tradition in any vocation makes for greater efficiency. The young gentlemen are at a most impressionable age, and despite the *penchant* that youth has for jeering at those who have gone before, it is certain that some inspiration must come from a knowledge of the successes of their predecessors in the Navy. What young man—mayhap he is studying the history of the World War—can look upon Gribble's "The Return of the Mayflower," depicting the entrance into Queenstown of our first destroyers in 1917, without a thrill of pride, and without experiencing a determination to be ready himself when duty calls?

Who of us can look upon the tablet in Memorial Hall, dedicated to those who lost their lives after a voluntary 1,500 mile voyage in an open boat, to bring succor to their comrades of the shipwrecked *Saginaw*, without at least wondering if we can meet the supreme test so courageously? Does not the tablet to Lieutenant Stanton F. Kalk, who surrendered his place on a life raft, after the torpedoing of the *Jacob Jones* in 1917, and in consequence lost his life that an enlisted man, a non-swimmer, might live, conjure up visions of a young officer meeting his Maker manfully, in accordance with "the best traditions of the Service"? And does not the gazer have inculcated just another bit of naval character, to help him in his own hour of trial, when duty will call, and when he must not be found wanting? And so on through the many books, portraits, monuments, and tablets, which the Naval Academy preserves to assist in the character moulding of its youth. A brief history of the more important memorials has been printed, and a copy has been furnished each midshipman.

WITH A GROUNDWORK OF EDUCATIONAL FUNDAMENTALS, UPON
WHICH EXPERIENCE AFLOAT MAY BUILD THE FINISHED
NAVAL OFFICER

The academy does not attempt to turn out finished naval officers. Without adequate experience afloat, as officers, it would be a hopeless task. This is an important point, and one often discussed in the Service. The Naval Academy turns the graduate over to the Service, for seasoning and further training in the school of experience.

THAT HEALTHY MINDS IN HEALTHY BODIES ARE NECESSITIES

It is recognized that human nature contains certain unfavorable elements as well as favorable ones, and that these must be combatted by physical, as well as educational, means. The body must be healthy, if the mind is to be so. The American youth is frequently equipped with a super-abundance of energy, which must be diverted into proper channels, to prevent it from flowing into mischievous—or worse—ones.

Athletics thus serve a number of purposes. Through personal association, they satisfy the gregarious instinct which demands company—that is, they prevent loneliness. Through the successes of our teams, they increase the midshipmen's pride in the Academy. They increase company, battalion, class, and Academy spirit. They fit the graduates to coach ship's athletic teams. And what is more important, the general athletic system, completely standardized, does much to keep the regiment healthy, and builds up their physiques to keep pace with their constantly developing minds. It develops also certain qualities of leadership, such as good sportsmanship, instant decision, concentration, willingness to work hard, and self denial.

IF—THE GRADUATES CARRY INTO THE SERVICE RESPECT AND
ADMIRATION FOR THIS ACADEMY

The last part of the mission opens up a wide field of opportunities for good. The nature of the life is such that there will always be a feeling of relief when the coveted diploma has at last been won. Whatever is worth having, is worth working for; but there are so many slips between the cup and the lip, that success

naturally means a release from an enormous strain—hence the spirit of “Thank God we’re out of the wilderness.” The feeling is perfectly natural, and there is no desire to change it. The aim is rather to have that “out of the wilderness” *paean* mean nothing more than the lifting of the safety valve, before the graduates settle down to a life of steady steaming, with heart and mind gratefully reminiscent of Academy days.

The policy is to give the midshipmen all the authority they are capable of handling. But this authority goes hand in hand with responsibility. They are held strictly accountable for their actions. The policy is to lead, rather than to drive. They are encouraged along a road, rough going at its best, and those who fail to measure up are summarily dealt with. A year’s trial of this plan is encouraging but it will require one, or perhaps two, more years to establish definitely that the system is an improvement. The system is on trial, but gives every indication of success. The regiment realizes that the effort to relieve the grayness of Academy life means that, more than ever, they must measure up or take the consequences. There has been no let-down in discipline—quite the contrary.

Graduates who love the Academy will love the Service, and will make the necessary sacrifices, when the time comes, with a smile. They will come back to the Academy as Officer-Instructors, willingly, cheerfully, even eagerly. They will teach others to love the Academy, and in not so long a time there may be a waiting list for academy duty. Officers will be fighting for the detail. Then, as now, the midshipmen will be happy, interested, thoughtful, but with a greater sympathy for the Academy and the Service. This may come with the millenium; but at least we have a *target*.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE NAVY'S PAPER WORK

REAR ADMIRAL CASPAR F. GOODRICH, U. S. NAVY

Twenty-five years ago, just before he became Secretary of the Navy, I told Governor Long that the volume and burden of official correspondence had grown to such dimensions as to be almost intolerable. I recall one expression of mine which seemed to impress him by its earnestness. "You can have efficient men-of-war under you," I said, "or perambulating offices, but you can not have both in the same ship." If this was true in those days, what, I venture to ask, is service opinion on the subject now?

Even then, the *Navy Regulations* had grown from the modest pamphlet of 62 small pages in 1832 to a book of 440 octavo pages in the 1896 edition. The latest issue within my reach contains 417 pages of regulations plus 569 of instructions (a distinction without a difference) not including appendices. What may be the bulk of the current volume I do not know. It must be a staggering tribute to the god of centralization. His ever-present cult is intimately related to our subject. Due to it, there follows, as naturally as water runs down hill, a steady and vast increase in official correspondence that absorbs time on the part of the captain afloat which were better employed in preparing his command for battle or of the commandant of a naval station which should be devoted to the larger duties of his post rather than to signing his name to perfunctory endorsements hundreds of times daily.

Furthermore, I told Governor Long that, in order to stand well in the estimation of the Navy Department, a commanding officer had only to keep his correspondence voluminous and up to date, scrupulously exact and according to Hoyle in each particular, every "t" crossed and every "i" dotted. Whether his vessel was dirty and slack, or unable to maintain her trial speed or to hit the target, mattered little in comparison. I added that I, per-

sonally, stood low in the scale because I made it a rule never to write to the Department unless absolutely necessary and never to reply to its communications except when positively directed to do so, although I was sure that my own command was second to none of her class in condition and efficiency, while the crew were happy and contented to an unusual degree. I wonder if the same unfortunate standard still prevails, modified, as it must be, by the new and admirable requirements as to gunnery and steaming competitions. I trust that some one, better informed than I, can reassure me on this point.

A glance at the twenty-odd pages in the *Instructions*, listing the reports and returns, raises the question whether many, if not most, of them could not be eliminated to advantage. Would it not be well to exact specific reports when things go wrong or when a ship's efficiency falls off in any respect or when some especial occurrence should be brought to the attention of the Department or a bureau and to suppress periodical reports which merely state that all is right? Why not take the latter for granted?

Often have I thought that, given the power, a Secretary of the Navy might do a wise and patriotic thing were he to call in his chiefs and notify them that at the end of the current fiscal year he would discharge half the clerks under the Department in Washington and elsewhere; that after the close of the ensuing six months, he would discharge half the remainder, thus giving ample notice in order that these bureau chiefs could, at their leisure, adjust their business accordingly. While this is a mere figure of speech, not to be taken *au pied de la lettre*, is not the fundamental idea sound? Does any person think that the Navy would suffer seriously through the introduction of such a measure, even in part?

It is rather a distressing reflection that this constant growth of paper work is due to ourselves in general and, in particular, to such of us as, occupying important positions at the Navy Department, fail to resist appeals by the clerical force for new reports and returns which, for the most part, serve only to bring grist to that force's mill; to increase the use of stationery; and still further to impair the initiative of the men afloat or otherwise away from Washington.

A certain amount of centralization is undoubtedly necessary but every effort to increase it beyond the irreducible minimum should be resisted to the last extremity and never yielded to until proved, beyond peradventure, to be essential. Can any sane man imagine a like code of minutiae being laid down by the main offices of our great industrial organizations such as the Standard Oil or the Pennsylvania Railroad? The practice in civil life is to place at the head of each division a competent man, held to strict accountability for results and clothed with commensurate authority. In this way, success is assured and dividends earned. Moreover, decentralization stimulates subordinates to think for themselves and to act promptly, in accordance with the known policy of their superiors, when occasion arises with no time available for reference to headquarters. Such a self-reliant practice must be of inestimable value to naval officers in times of national complications or any other emergency. Our history is replete with such instances. The Navy is one of the largest business corporations in the land. Its stockholders are the American people. It rests upon us naval officers who administer its affairs to make sure that the people get one dollar's worth of value for every dollar expended; and to see that all waste be cut out. Besides countless other things which are not within the scope of this article, are there not extravagance in stationery here, an unnecessary clerk there, too many typewriters and red tape everywhere, costing the nation, in the aggregate, quite a notable sum of money coming from the already overburdened taxpayer? The moral effect on the service is even more regrettable in causing even trivial matters to be referred to headquarters which could at least as well, if not indeed better, be dealt with by the man on the spot.

"Many a mickle makes a muckle," say the canny Scot. These small savings would not only total something worth while but the example of these *petites economies* would be followed in larger things. Is it not our duty, especially in these days of lessening appropriations, to stop all avoidable waste and devote the savings to the fleet? If so, we ought to act in a negative sense by carefully scrutinizing all suggestions for increasing our paper work and, positively, by cutting what we now have to the bone.

It is astonishing to what extent we hamper ourselves by ex-

cessive amounts and careless methods of correspondence. During my last service on the active list, I was commandant of the New York Navy Yard. Supported by Mr. Newberry as Assistant Secretary and, later, as Secretary of the Navy, I inaugurated many short cuts in official correspondence which reduced the time consumed in handling any subject to a remarkable degree; greatly simplified every step; and eliminated much paper work. In my own office, when a vacancy occurred in the clerical staff, I was able to report that it need not be filled. My heads of departments were of the opinion that, on any job, the time required to get it started fell from an average of ten days to forty-eight hours. For this reason I speak as one not without experience. What I advocate can be done because it has been done. I am, by the way, under the impression that this departure from former practice was subsequently disapproved and forbidden.

The Department is and must be guided by the counsels of its chosen advisers. They, in turn, reflect service opinion. If naval officers like to be governed and directed in every trivial matter by word from Washington; to be deprived of individual initiative in carrying out loyally the expressed policy of the Department or any one of its bureaus; they can do no better than to encourage and foster this tendency toward complete centralization with its flood of reports, returns, etc., but if they aspire to discharge, with credit to themselves and honor to the Department, that trust embodied in their commissions in the President's own words, they should lose no opportunity to combat the rule of the typewriter, that potent instrument of centralization. In so doing, they would free themselves from unnecessary hobbles; further the just aims of the Navy; and aid our chiefs of bureaus in ridding themselves of a mass of details that make it difficult for them to study the really great problems which they alone are competent and authorized to solve. I can but feel that these important officers, charged with the weightiest responsibilities, would welcome the help of an active interest in this subject by all and sundry with the support of a strong service public opinion. It is to call the attention of my brother officers to this seemingly unimportant question that these words have been written. If I am wrong in my beliefs, some one who knows might take great pleasure in correcting me and thank me for the opportunity I offer of setting me right.

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NAVIGATION VERSUS THE JUNIOR NAVAL OFFICER

BY COMMANDER JOHN DOWNES, U. S. N., HEAD OF DEPARTMENT
OF NAVIGATION, U. S. NAVAL ACADEMY

In the early summer of last year (1922) some seven hundred officers of the grades of Lieutenant, Lieutenant (j.g.), and Ensign, became eligible for promotion to the next higher grade and were given the required professional examination. The examinations were held practically simultaneously at various naval stations, on board ship, and at Washington, and were conducted by Supervisory Boards at all places except the last mentioned, and at the Mare Island Yard. This resulted in a flood of papers being received by the Naval Examining Board, quite beyond its facilities for handling them and as a result certain officers of the Naval Academy in the Departments of Navigation, Seamanship, Ordnance and Gunnery, Electrical Engineering, and Marine Engineering, were ordered to temporary additional duty to assist the Naval Examining Board in marking papers on subjects pertaining to their respective departments. In the Department of Navigation this work took nearly two months, two officers working six to seven hours a day, five and a half days a week. In all, five hundred thirty-seven papers were handled. Of these over half were those of Naval Academy graduates, the remainder being papers of former temporary officers.

It was natural to assume that the Naval Academy graduate would know more about refined navigation than the former temporary officer and such was found to be the case. The former's work was much more accurate and the plotting was much neater than that of the latter. So much of the work of both, however, was open to criticism that it is believed that the pointing out of the common errors of both will be of benefit to the younger line

officers in future examinations, and in their navigational work at sea.

Before proceeding with the criticisms, however, it is desired to point out that the Department of Navigation considers as not a minor part of its Mission that it exists for the purpose of benefiting the Service at large in the science of Navigation. To this end it keeps in constant touch with the Naval Observatory, the Hydrographic Office, Coast Guard Officers, and the Coast and Geodetic Survey, either through direct correspondence, personal visits, or their publications. It communicates with inventors of new navigational appliances or new methods of navigation and attempts to keep up to date in every respect, passing the information on to the midshipmen whenever the information is considered reliable and to be of benefit to them. The Department laboratory is enlarged from time to time by the receipts of new instruments or by exhibits of instruments used in days long gone. It is still far from complete, however.

A careful resumé of all the papers disclosed the fact that the majority of all the officers examined were lacking in a good knowledge of the following:

1. Description of, and activities of, the Coast and Geodetic Survey, The International Ice Patrol, and the Board of Steamboat Inspectors.
2. The magnetic and the gyro compasses, causes of error, and correction of same. Advantages of the latter.
3. Duties of the Navigator pertaining to target practice and battle, use of mooring board and Battenberg Course Indicator for battle approach.
4. An understanding of Zone Time and keeping Zone Time at sea.
5. Certain parts of the contents of nautical publications.
6. Lack of knowledge of harbor surveying.
7. Inaccuracies in "day's work."

Each of the above will be taken up in turn and the common errors made will be given. It should be borne in mind that this article is in no way intended as a criticism of the officers who were examined, nor as an expression of opinion as to their fitness as a group, but is a critique of the general knowledge of the science of Navigation among younger officers with suggestions

for improvement. The idea is to "point the way" for those to be examined in the future.

Coming now to the above listed errors we will take them up individually in their numerical order.

1. *Description of and activities of the Coast and Geodetic Survey, the International Ice Patrol and the Board of Steamboat Inspectors.*

Of the various offices that are more or less co-related with the Navy, the candidate seems to be deficient in his knowledge of the functions of the Coast and Geodetic Survey, the International Ice Patrol, and the Board of Steamboat Inspectors. The first mentioned of these is by far the most important as it supplies many of our charts and most of our tidal data, together with the Sailing Directions for the United States. The second, under the Treasury Department (Coast Guard), furnishes information covering ice in or near the usual steamship routes to Europe and its duties have at time been performed by naval vessels. As the naval officer is often called on especially just before, or during war, to inspect merchant ships with a view to their being taken over by the Navy, a knowledge of the Board of Steamboat Inspectors and its requirements is necessary. The best possible available information on the subject will be found in the following paragraphs:

The purpose of the Steamboat Inspection Service is the security of life on board of vessels and the prevention of loss of vessels and of property thereon.

**Inspection required.* The laws governing the Service require at least one inspection each year of certain domestic merchant steam, motor, and sail vessels, and barges, by an inspector of hulls and an inspector of boilers of the Service. Foreign steam vessels carrying passengers from ports of the United States, except by countries having reciprocal inspection relations with the United States, are required to be inspected. Foreign steam vessels of countries having reciprocal inspection relations with the United States require an annual examination by inspectors of the Service.

The inspection of a vessel embraces the inspection of the hull and all equipment thereon, including life-saving appliances, fire apparatus, boilers, and machinery.

Particulars of inspection. In order that a better idea may be had of the extent of inspection and functions of the Service, some of the principal particulars of inspection are stated, as follows:

*Extracts from a letter to the author from the Supervisory Inspector General, Steamboat Inspection Service, Department of Commerce.

Life-saving equipment. At least one approved life preserver is required on board for every person allowed to be carried on every inspected vessel. As far as practicable lifeboats and life rafts are required to be carried. Lifeboats and life rafts are required to be provided with necessary equipment, such as oars, rowlocks, painter, and life lines. Lifeboats on ocean vessels are, in addition, required to be provided in part with rations, fresh water, sea anchor, with oil attachment, compass, lantern and matches, red distress signal lights, and mast and sail. Certain ocean steam vessels are required to carry line-carrying guns and projectiles. Ring life buoys, some luminous, are required to be carried on certain kinds of vessels. Vessels are also required to be provided with fog bell, fog horn, lead and line, running and anchor lights, and certain classes of vessels are required to carry deep-sea lead and line, storm oil, and be provided with bulkheads.

Fire apparatus. According to class of vessels, the following kinds of fire apparatus are required: steam pumps, hand pumps, fire extinguishers, water barrels, buckets (the barrels and buckets to be kept filled with water), axes, fire-alarm systems, water-sprinkling systems, and auxiliary lighting systems.

Boilers and machinery. Every boiler in use on vessels under the jurisdiction of the Steamboat Inspection Service is inspected at least once in each year. The boiler is subjected to an internal and external examination. At every annual inspection each boiler is subjected to a hydrostatic test in the proportion of 150 pounds hydrostatic pressure to 100 pounds of working pressure allowed. Boiler plate subject to tensile stress in boilers is tested as to physical and chemical qualities under the supervision of inspectors of the Service. Boilers must be provided with safety valves, steam gauges, approved fusible plugs, and other necessary valves and fittings. The machinery and all connections are inspected.

Dangerous articles. Certain dangerous articles, such as naphtha, benzine, and nitroglycerine, are forbidden by law to be carried as freight or stores on steamers carrying passengers.

Counting of passengers. The number of passengers and crew that a vessel can safely carry is, in most cases, limited by the inspectors; and, from time to time, the inspectors count the passengers carried to see that the lawful limit is not exceeded.

Licensed officers and crew. Masters, mates, pilots, and engineers of certain classes of steam and motor vessels are required to be licensed by officers of the Service, after having had the required experience and passing an examination. An examination in the principles of first aid is now also required for original license. A visual examination is required for masters, mates, and pilots. Masters and chief mates of certain classes of sail vessels and masters of passenger barges of over 100 gross tons, with experience qualifications, after passing an examination, and operators of motor boats are also required to be licensed. No examination is required for operators of motor boats. Lifeboat men and able seamen are certifi-

cated. Licenses may be suspended or revoked for unskillfulness, misbehaviour, or negligence.

The complement of licensed officers and crew required to be carried on an inspected vessel is determined by the inspectors.

Rules for vessels passing. The Board of Supervising Inspectors, with the approval of the Secretary of Commerce, prescribes rules for steam and motor vessels in passing each other, and lights required to be carried by ferryboats, and by barges and canal boats when in tow of steam vessels, and by dredges, etc. The pilot rules are prescribed and published for three kinds of waters, namely: (1) Inland waters of the Atlantic and Pacific coasts and of the coast of the Gulf of Mexico, (2) Great Lakes and their connecting tributary waters as far east as Montreal, and (3) Rivers whose waters flow into the Gulf of Mexico and their tributaries, and the Red River of the North.

The authority for the pilot rules for the inland waters of the Atlantic and Pacific coasts and of the coast of the Gulf of Mexico is the act of Congress approved June 7, 1897, "To adopt regulations for preventing collisions upon certain harbors, rivers, and inland waters of the United States," as amended by various acts of Congress.

The authority for the pilot rules for the Great Lakes and their connecting and tributary waters as far east as Montreal is the act of Congress approved February 8, 1895, as amended by the Motor Boat act of June 9, 1910.

The authority for the pilot rules for the rivers whose waters flow into the Gulf of Mexico and their tributaries and the Red River of the North is section 4233, Revised Statutes, as amended by various acts of Congress.

Organization. The Supervising Inspector General is the head of the Bureau of Steamboat Inspection Service. Under him are ten supervising inspectors, and under the ten supervising inspectors are forty-six boards of local inspectors, each board consisting of an inspector of hulls and an inspector of boilers. Some boards have assistant inspectors of hulls and assistant inspectors of boilers, and clerks. The local boards and supervising inspectors are located in the principal cities of the United States. The ten supervising inspectors with the Supervising Inspector General form the Board of Supervising Inspectors. The Board of Supervising Inspectors meets at least once in each year and makes regulations for the government of the Service. These regulations are published under the title of General Rules and Regulations.

The authority for the establishment of the Steamboat Inspection Service and for its various functions is contained mainly in Title LII, Revised Statutes of the United States, and in various other Revised Statutes, and acts of Congress.

History. The Steamboat Inspection Service had its beginning in the act of Congress approved July 7, 1838, which provided for the better security of the lives of persons on board vessels propelled in whole or in part by steam. Various other acts of Congress affecting the Service have

subsequently been passed. The act of Congress approved August 30, 1852, really established the Steamboat Inspection Service, and the act of Congress approved February 28, 1871, gave what is the present law upon the organization and administration of the Steamboat Inspection Service, codified in part in Title LII, Revised Statutes, and which has been amended from time to time.

PUBLICATIONS AND FORMS

Laws Governing the Steamboat Inspection Service.

General Rules and Regulations Prescribed by the Board of Supervising Inspectors, four kinds, namely: (1) Ocean and Coastwise, (2) Great Lakes, (3) Bays, Sounds, and Lakes other than the Great Lakes, and (4) Rivers.

Pilot Rules for the Inland Waters of the Atlantic and Pacific Coasts and of the Coast of the Gulf of Mexico.

Pilot Rules for the Great Lakes and their Connecting and Tributary Waters as far East as Montreal.

Pilot Rules for the Rivers Whose Waters Flow into the Gulf of Mexico and their Tributaries, and the Red River of the North.

Annual Report of the Supervising Inspector General for the year ended June 30, 1921.

Certificate of inspection for steam or motor vessel.

License for master of steam vessels.

License for chief engineer of steam vessels.

Certificate of efficiency for lifeboat man.

Certificate of service for able seaman.

2. *The Magnetic and gyroscopic compasses, causes of error and correction of same. Advantages of the latter.*

Officers generally had only the faintest idea of the theory of deviations. They did not know the three causes of deviation when on an even keel; the three components of deviation; the cause of additional deviation when the ship heels; the difference between the heeling magnet and the Flinders Bar; the advantage of compensating on the magnetic equator and the necessity of recompensation for change of latitude provided there is no Flinders Bar installed; used the Flinders Bar for compensating for dip; only adjusted the heeling magnet after observations in two latitudes.

Most officers seemed to have memorized the practical compensation and were able to answer the practical problems whenever they could get on the proper heading and determine the deviation. This was about half the time.

About one-third of the officers examined, understood the physical principle of the gyroscopic compass and in replying to questions on this compass were prone to emphasize mechanical features, rather than broad operating features, such as freedom from variation, use behind armor on account of freedom from local magnetic influences; more accurate steering on account of absence of oscillation, etc. Governing principles, such as the seeking of the Meridian by the axis of the gyroscope, why the axis vibrates on each side of the Meridian and must consequently be "damped," and why it is necessary to apply mechanical corrections to the instrument for change in latitude and change in speed, were not mentioned by a great many.

3. *Duties of the Navigator pertaining to target practice and in battle; use of the Mooring Board and Battenberg Course Indicator for battle approach.*

The Navy Regulations direct that in battle (and of course in target practice) the Navigator shall be the Ship Control Officer and shall take station in the Conning Tower or elsewhere as may be necessary to enable him to assist the Commanding Officer in handling the ship. Few officers, who have not been Navigators, realize the extreme importance of this duty and that the battle may be easily lost through failure to get the ship into the desired position in the quickest possible time. To be successful, therefore, it is essential that the navigator be thoroughly familiar with all the tools placed at his disposal for accomplishing his job and among these are the Mooring Board and the Battenberg Course Indicator. It is needless to remark that these two articles are also invaluable for another purpose—mooring, or anchoring in position—so it behooves the young officer to be thoroughly acquainted with at least one of them. There are, of course, substitutes for these, as for instance, Bray's Approach Omnimeter and Hunter's use of the Universal Drafting Machine, but the Mooring Board and the Course Indicator are the "old reliables"—approved by the Department—and with which everyone is presumed to be familiar. The recent examinations, however, disclosed this presumption to be incorrect.

4. *An understanding of Zone Time and keeping Zone Time at sea.*

There is little to be said regarding the shortcomings under this

heading as "It's all in the book" and one has but to digest Article 1031, of the *Navy Regulations*, or Article 190, *Navigation, 1922*,* to gain a complete knowledge of this subject. The chief difficulty seems to be that a great many officers were unable to determine the zone description from the known L.M.T. and Longitude.

5. *Certain parts of Nautical Publications.*

The knowledge of the contents of Nautical Publications on the whole was good, but there were certain particular parts of which many were inexcusably ignorant and these may be classified as follows:

- (a) The current charts in the Tide Tables.
Comment: Inability to interpret them.
- (b) Definitions in the front of the Light Lists.
Comment: Lack of fundamental knowledge.
- (c) Ignorance of the fact that the Sunrise and Sunset Tables are made out for L.M.T., and tidal data in Standard Time.

6. *Lack of knowledge of harbor surveying.*

While the Navy has little general surveying to do, except in Cuba and Central America, the situation often arises where changes have been noted in small, rather unfrequented harbors and as these harbors have to be used from time to time by our small naval craft and by United States merchant ships, it becomes advisable as a matter of safety to re-survey them. Such a case came within the experience of the writer at Puerto Plata, D. R., while attached to the *Nashville*. It was found that the chart of this harbor was very incorrect both in the approach and at the anchorage, and that the conspicuous landmarks were not correctly plotted. A survey of this harbor was therefore directed and was completed in less than a month. It would have taken two months had the officers engaged in it not had a good knowledge of the principles involved.

7. *Inaccuracies in Day's Work.*

The solving of the Day's Work was, on the whole, only fair, and the plotting of the lines and fixes was miserable. The principal faults to be found were:

- (a) In working out the "Interval to Noon" the hour angle from the a. m. *dead reckoning position* was used instead of the

*New Textbook at the Naval Academy.

"Navigator's Position after a. m. sight" which is the position on the a. m. line-of-position known as the "Computed Point." In other words, it is the point given by the value of "a" and through which the "line of position" is drawn. This is the most accurate position obtainable from one line as it is the mean of all possible positions. Also, in performing the computation of the equation for Interval to Noon, all reference to current in longitude was omitted and consequently the answer was not correct.

(b) Having obtained a fix for L.A.N., failure to run it up or back for clock noon.

(c) Lack of accuracy.

In the practical compass problems nearly all were familiar with the methods of placing the magnets but did not know how to set the azimuth circle to get on desired magnetic heading. This is of extreme importance when compensating at sea. Ignorance was also shown in plotting the curves and in the use of them if they happened to be successfully plotted. Further, it should be definitely stated whether L.A.T., or W.T., is used in the construction.

It is believed the foregoing seven subheads list the principal errors to be found in the papers referred to. Taken as being found in each paper they would indicate that knowledge of Navigation was decidedly on the wane. Such was not the case, however, but a sufficient number *were* found in almost every paper to offer a serious indictment against the younger officers in regard to their knowledge of navigation and the principles involved. All naval officers of the Line except those who have dedicated their careers to engineering only, *must* be good navigators. They may also be good gunnery officers, or radio fiends, but they *must be good navigators* just as they must be good seamen.

As stated earlier in this article the Department of Navigation at the Naval Academy endeavors to keep up and put into practice the latest thought in the Art of Navigation and it seems remarkable that officers generally, especially those who at any time may have to fleet up to Navigator's duties or who may be ordered to duty as Navigator, do not keep in touch with this department and have their names put on its mailing list for practical works and examinations. These practical works and examinations are always made out according to the latest practices and would be

invaluable in keeping up in Navigation; also, they are used by the Examining Board in preparing examinations for promotion. Keys (gouges) are furnished with them. Correspondence is always invited and the Department will always endeavor to furnish the latest information on any subject pertaining to Navigation. It should also be borne in mind that the Pilot Chart issued monthly contains a fund of information useful alike to the naval officer and the merchant marine.

It is hoped that the near future will see an awakened interest in this most important subject on the part of the younger officers of the Service.

The time available at the Naval Academy is too limited to do more than teach the fundamentals and it is up to the graduate to broaden his knowledge after becoming a commissioned officer. The Naval Academy aims to build a firm foundation and leaves it up to the individual to "build his house."

DISCUSSION

Life Insurance as Applied to the Naval Service

(SEE WHOLE NUMBER 238, PAGE 2107)

REAR ADMIRAL T. J. COWIE, (SC) U. S. NAVY.—Mr. Webb's Tables II and III, comparing the deaths among all the Naval Academy graduates (1860-1916) and among those insured in the ten companies (1917-21) with the American Tables, seem to show Naval Academy graduates rather delicate, as they show 96 per cent of tabular mortality, while those insured (in the ten companies) reached this percentage only in 1918 and then the average is 68 per cent of the tabular mortality for the five years mentioned.

There is not sufficient information for a full comparison to be made, but obviously it is hardly fair to compare *all* Naval Academy graduates with selected risks accepted by insurance companies. The former could not be expected to insure materially less mortality than the average American, while the latter are selected at various ages.

It is generally known that of late years, the death rate of elderly and old people is going up and of those below middle age going down. This is in accordance with Mr. Webb's table for Naval Academy graduates. If he had not included a number of early classes who are now nearly all dead, his percentage would have been materially lower. Presumably, the deaths given for the insurance companies are a comparison of a single year and are those on the rolls with the tabular mortality. If this be the case, it is obviously unfair to compare this with deaths extending back over sixty years. We know that during these sixty years the death rate has steadily declined.

The reason given by Mr. Webb for the discrimination of insurance companies against Naval Officers seems rather dubious.

I fully agree with Mr. Webb as to the order of preference of types of life insurance. What we buy from insurance companies is protection and straight life or long-term life is the cheapest protection. Insurance policies with investment features are poor *investments*.

The rates of \$1,000 insurance given by Mr. Webb on page 2113 for a man of twenty-five years of age vary from \$18.28 for straight life, the cheapest form, to \$44.84 for twenty-year endowment.

The proof of the pudding is in the eating.

I give below the *actual* cost of \$1,000 insurance in the Navy Mutual Aid for all members who entered between the ages of twenty-four and twenty-seven and subsequently died, arranged in ten-year groups. These

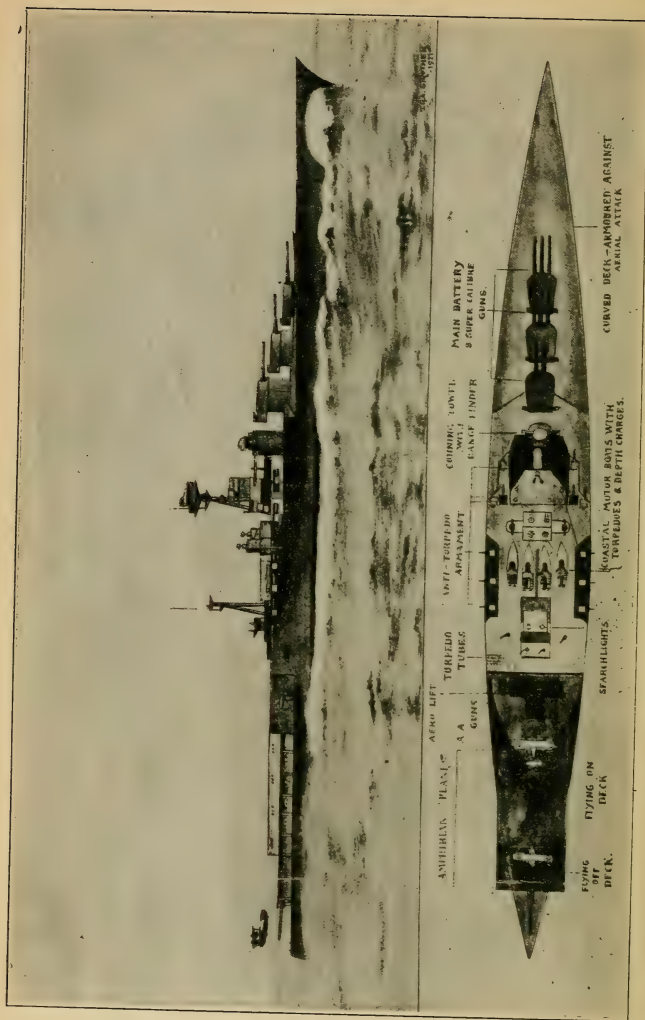
are from the amounts actually paid in and are taken from the Annual Report for 1921, which gives the deaths of all members since organization, with the cost per \$1,000 at date of death.

<i>Years</i>	<i>Number of deaths of members between twenty-four and twenty-seven years when entering</i>	<i>Average cost per \$1,000 of Benefit paid</i>
1880-89	5	\$ 4.16
1890-99	10	8.95
1900-09	6	9.98
1910-19	11	10.61

Of course, in the early days the cost was necessarily small, but the figures for the last twenty years show a negligible rise and the lowest straight life figure (\$18.28) quoted by Mr. Webb is somewhat more than seventy-five per cent greater than the Navy Mutual Aid's actual experience of the last twenty years.

It may be of interest to here note that the Annual Report of the Navy Mutual Aid Association for 1922 shows a death rate per thousand of 9.41 and an average age of 64.92. It also shows the actual cost per thousand during the year of an officer of the age of twenty-five as \$5.11. It should also be noted that the Navy Mutual Aid Association takes charge of pensions, War Risk Insurance, compensation, and all other claims for widows and dependents of deceased members, doing everything possible to obtain speedy action and avoid every possible inconvenience or annoyance to widows.

From what has been stated, it seems to me that the first duty of every officer of the Navy is to obtain protection and aid afforded by this Association, and then procure all the additional straight-life insurance he can possibly carry.



FUTURE FIGHTING SHIPS: AN IMPRESSION

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER F. W. ROCKWELL, U. S. NAVY

and

LIEUTENANT J. B. HEFFERNAN, U. S. NAVY

GENERAL ARRANGEMENT

VESSELS BUILDING	}	Great Britain	483
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GREAT BRITAIN

THE NEW BATTLESHIPS.—The contracts require that both ships be completed in three years and the contract price is about six million pounds apiece. The displacement of the vessels will be in accordance with the treaty limitation, 35,000 tons each: Their length will be 660 feet; their beam 106 feet, and their speed will be symmetrical with that of the older British battleships—23 knots. It is reported that both ships will have oil-burning boilers, and that they will be driven by turbines through reduction gearing. The fuel oil capacity provided for will give these ships a far greater cruising radius than any other British capital ships. The plans call for three triple gun turrets, mounting 16-inch guns. Thus these ships will have nine 16-inch guns, and it is interesting to note that after predicting the failure of our triple turrets the British have at last adopted them, and not only that but they will have the 16-in. triple turret before we do, because the *Maryland*, *Colorado*, and *West Virginia*—our 16-in. gun ships—carry their eight 16-in. guns in twin turrets. Statements in some papers are to the effect that two of the three turrets are to be located on the forecastle, while the third is to be located just abaft the bridge and forward of the funnel. If this is the case then the quarter-deck will be entirely clear and there will be practically no possibility of astern fire. It is further reported that a heavily armored citadel will enclose the barbettes of the three turrets, the conning tower, and possibly the uptakes to the funnel.

Reports in the press have differed in regard to the armor protection of the ship, but it is now reported that the main belt will be a maximum thickness of 13 inches. Apparently there are to be three armored decks, including the weather deck.

The anti-aircraft battery is said to consist of twelve 4-in. high angle guns, mounted in pairs. The secondary battery will consist of twelve 6-in. guns, mounted in three 2-gun turrets on each broadside. There will be above-water triple tubes for torpedoes, fitted it is said for the 21-in. Whitehead torpedo.

As mentioned above the quarter-deck will be large and free from obstructions and it has been reported that it is designed so in order to provide a flying off deck or landing deck for airplanes. It is further reported that the turrets will be operated by hydraulic gear and that the steering gear will be hydraulic.—J. B. N.

BRITAIN'S NAVAL HOLIDAY.—A special interest attached to the laying-down of the new minelayer at Devonport last Wednesday. The vessel herself may not be a unit of the first magnitude, but she has the distinction of being one of the only two men-of-war that are now under construction for the British Navy. Thirteen months before—on November 1, 1921, to be precise—the keel of submarine *X-1* was laid at Chatham, after a pause of three years in new naval construction. During those thirty-six months that succeeded the armistice, when the only work in British dockyards was confined to finishing off vessels begun under the war program, the laying of new keels went on apace in the yards of America and Japan. The post-war building activities of those two Powers included a score of capital ships of the largest dimensions, a still larger number of fast cruisers, and shoals of torpedo craft, surface and submarine. It is true that the Washington Treaty has temporarily suspended work on most of the capital ships, but all other types are being proceeded with, and the light cruiser and submarine forces of Japan alone will soon be superior to ours.

There is, of course, no precedent for the stagnation in naval shipbuilding which has prevailed in this country since the war. Admitting that the circumstances, both political and financial, have justified our negative policy in this respect up to now, it becomes a question as to how much longer we can afford to keep our dockyard slips vacant. If battleship competition has ceased, there is still a pronounced rivalry in other man-of-war types whose tactical value was revealed by war experience. Can Great Britain look on with equanimity at the rapid multiplication of foreign cruisers and submarines, and do nothing to maintain her own position with respect to these indispensable craft? It would, no doubt, need some courage to bring forward at this juncture, a new program of any description, having regard to the state of the budget and the staggering cost even of minor naval construction. But that is nevertheless the duty that must be undertaken by the Admiralty in the near future if our naval position is not to be hopelessly compromised. There is one question we would put without any tendentious purpose, but merely to focus attention on the hard facts of the situation: At the present rate of progress shall we have anything to match the splendid fleet of twenty-five light cruisers—with an average speed of 33 knots—which Japan will have in commission three or four years hence?

Details of the new minelayer are not yet available, but her principal features will be approximately:

Displacement	7,000 tons
Length	500 feet
Beam	58 feet

She has been designed by Sir E. H. Tennyson d'Eyncourt, and the design marks a new departure, so that she may be regarded as an experimental ship; and, although the character of her armament is at present confidential, it is believed that she will be heavily armored for a vessel of this

class. Whether her construction will be rapid or otherwise is not yet known—this will depend upon the Government's naval policy in the future, and upon international developments; but the Navy Estimates for the current year only provide for £294,990 to be spent upon her up to the end of next March, and of this sum £50,000 is appropriated for dockyard labor and £75,000 for dockyard materials. The estimated expenditure upon the vessel up to the end of last March was £82,588, so that the total estimated expenditure up to the end of the financial year will be £377,578. It is an interesting fact that no other Royal yard will this year lay down a vessel of the dimensions of the new mine-layer.—*Naval and Military Record*, 6 December, 1922.

AIRCRAFT-CARRIERS.—The new aircraft-carrier *Hermes* is omitted from the Admiralty statement, probably because she is rapidly approaching completion. This vessel has been something of a mystery ship up to now, and the details of her which appear in Dr. Parkes' new book, *Ships of the Royal Navy*, are therefore of particular interest. In general design she is, it appears, a smaller edition of the *Argus* but, unlike that famous ship, the *Hermes* has a funnel and a tripod mast, both of which are placed over on the starboard side amidships. Her equipment, which includes all the latest types of gear for landing, handling, and launching aircraft, is considerably in advance of anything formerly employed for the purpose.

As the ship can steam at 25 knots and mounts the respectable armament of seven 6-in. guns, four 4-in. anti-aircraft, and nine smaller pieces, she would be no mean antagonist as a cruiser, although the big area of vertical and horizontal target she presents would handicap her in a duel with any conventional warship. Our largest aircraft carrier, the *Eagle*,* is now emerging from her big refit with an extra funnel and a tripod mast, together with numerous other improvements which, it is to be hoped, will render her thoroughly efficient for the work she has to do. From beginning to end this ship must have cost an enormous sum of money.—*Naval and Military Record*, 13 December, 1922.

NEW SUBMARINE DEPOT SHIP.—Converted into a submarine depôt ship at a cost of over £200,000, H. M. S. *Cyclops*, late repair ship, was commissioned at Chatham on Thursday for service with First Submarine Flotilla. The *Cyclops* is to take the place of the *Pandora*.—*Naval and Military Record*, 27 December, 1922.

THE TRAINING OF NAVAL ENGINEERS.—An announcement of capital importance to the Navy in general and the engineering branch in particular was made by the Admiralty on December 15. It signifies the virtual abandonment of the scheme which aimed at suppressing the distinction between the executive and engineering branches of the Navy. Introduced in 1902, this scheme has been in force twenty years, though it did not become absolute until 1905, entries of engineer students having been continued, on a much reduced scale, for three years after the system of common entry had been adopted in principle. The premises upon which the Admiralty of 1902 based its decision to revolutionize the method of entering and training officers for the engineering branch were set forth at length in the *Selborne Memorandum* of that year, and amplified in the *Cawdor Memorandum* issued three years later. In both documents the commanding influence that machinery had come to exert in the naval sphere was emphasized. "In the old days it sufficed if a naval officer were a seaman. Now he must be a seaman, a gunner, a soldier, an engineer, and a man of science as well." Therefore, it was argued, the logical course was to

* The *Eagle* was formerly the Chilean battleship *Almirante Cochrane*.—EDITOR'S NOTE.

train the future officer to be equally at home on the bridge or in the engine room. Fervid partisans of the scheme predicted a time when the deck officer and the engineer would no longer be specialists in the sense that one could perform deck or engineering duties better than the other. They were, in fact, to be absolutely interchangeable. This idea, like so many other daring innovations, sprang from the fertile brain of Lord Fisher, but it is now almost universally admitted to have been one of his least happy inspirations. Certainly it never evoked enthusiasm in the engineering world—as our own comments at the time clearly showed—nor was it ever warmly approved by the Navy as a whole. The first departure from the basic principle of interchangeability was foreshadowed in 1918, when, under the Admiralty regulations promulgated that year, a large majority of engineering specialists renounced the option of reverting to deck duty between seven and a-half and nine years' seniority. The process of separation was carried a long stride forward in 1920, when the First Lord announced in his statement on the Navy Estimates that officers selected for the engineering branch when sub-lieutenants would, after taking the advanced engineering courses, be definitely ranked as engineer officers, and never thereafter revert to deck duties. It was essential, the First Lord added that the majority of officers forming the engineering branch should be "whole-time" officers, in view of the fact that a definite distinction existed, both as regards knowledge and capabilities, "between those who are to be trained in the science of naval war and strategical and tactical methods of fighting, and those who are to deal with the upkeep and maintenance of engineering and mechanical appliances which are necessitated by the complex machinery and weapons of modern war. Each side requires a special study, and for this reason final separation of the branches is essential." These are truths that one would have supposed to be as patent in 1902 as they are today, for even twenty years ago the whole tendency of the professional and industrial system was toward greater specialization. In July, 1920, an Admiralty statement explained the new policy in detail. In accordance therewith, the transfer of duties in connection with the electrical installations of warships was arranged, these duties, hitherto vested in the torpedo lieutenant, a deck officer, being taken over by the engineering department. This change is to be made gradually, and will not be completed until a sufficient number of engineer officers who have qualified in the advanced electrical course are available to relieve the torpedo specialists throughout the fleet of responsibility for the electrical installations on board.

But while the two branches are henceforth to be entirely separate so far as their professional duties are concerned, the present system of common entry for both executive and engineer officers, and for common training until a certain stage is reached, will be continued. This means that the one thoroughly commendable feature of the original Selborne scheme is to be retained. Common entry undoubtedly fosters that close mutual understanding and co-operation between executives and engineers which, in the Admiralty's words, are "essential to the efficient use of a fleet in modern warfare." The future deck and engineer officers of the Navy will therefore enter Dartmouth together, and together undergo that early training which stamps the impressionable mind of youth so indelibly. Both will be bred up, as it were, in the traditions of the great Service to which they belong. Final separation will come immediately on passing out of the cadet's training ship, when those destined for the engineering branch will undergo a course of four years in mechanics and electricity at Keyham College and in H. M. S. *Vernon* before being assigned to duty afloat. Some years must, of course, elapse before officers trained under the new system become available for duty as engineer officers, and consequently,

the present method of specialization is to remain in operation for the time being. The final selection of officers to specialize under the existing scheme is to be made early in 1924, and the final course will commence in October, 1924.—*The Engineer*, 22 December, 1922.

FRANCE

NINE NEW SUBMARINES.—A telegram from Toulon announces that the Minister of Marine, M. Raiberti, has reached an agreement with the naval commission of the Chamber of Deputies for the rapid construction of nine submarines. Two of these boats will be constructed in the workshops of the Toulon Arsenal.—*New York Sun*, 10 December, 1922.

NAVAL CONSTRUCTION.—The debate on the Navy Estimates in the Chamber of Deputies did not cover the entire program of naval construction, for no reference was made to the light cruisers which it is proposed to build, and the credit of 1,045 million francs asked for is intended for the reorganization of the marine as well as for the construction of a dozen submersibles. It is argued that while the country had to concentrate on military armaments during the war the navy went back to the extent that it is no longer regarded as an efficient arm of defense. The most urgent need is, therefore, to reorganize it on a more scientific basis, with laboratories and facilities for carrying out experimental work and special attention must be paid to the training of an expert staff, which should be maintained in the highest state of efficiency. As the policy is based upon coast defense, the two chief factors are aeroplanes and submarines, in both of which it is claimed the country is deficient. Of the forty-seven existing submarines, it is stated that only eighteen are of any real military value. There are fifty seaplanes and thirteen airships, but in view of the progress of aviation, it is considered that the airship has become too vulnerable and there is no intention of building others. The program consists, therefore, in making the coast impregnable with the aid of seaplanes and submarines, which would keep hostile ships at a distance, while cruisers in which protection is entirely sacrificed to speed would assist in keeping the sea route open between France and the North African colonies. The construction of battleships warranted by the Washington Treaty, not yet ratified, although advocated in some quarters, has been abandoned for the time being on account of the necessity of devoting all the funds available to a purely defensive organization.—*The Engineer*, 22 December, 1922.

NEW PERSONNEL LAW.—We have commented several times on the proposed bill governing commissioned personnel. The following are the changes to take effect in each corps and show the principal modifications under the new law.

Line Officers. As compared with commissioned personnel, allowed by law of January 1, 1919, the new bill calls for the following reduction:

Vice Admirals	2
Rear Admirals	3
Captains	25
Commanders	20
Lieutenants	92
Lieutenants (jg)	85
Ensigns	164
*Lieutenant Commanders	105

* The allowance of Lieutenant Commanders is reduced to 215. The complement of Lieutenant Commanders as set forth by the law of June 10, 1917, is: 320, which number should have been attained by 1927.

The requirements necessary for promotion to the grade of Captain and Rear Admiral have been made more rigorous. Command at sea is one of the conditions absolutely necessary for promotion to the rank of Captain and Rear Admiral. Sea duty in command for a period of one year to eighteen months for promotion to Captain, and from two to three years for promotion to Rear Admiral, is required by the new law.

In addition, with the suppression of the rank of Captain, "residence fixe," the new bill provides for the following reduction of commissioned personnel from the cadre of "residence fixe":

Commanders	5
Lieutenant Commanders	9
Lieutenants	5

The age limit for officers of "residence fixe" will be the same as for officers of the corps other than the line: i.e.

Captains	58 years
Lieutenant Commanders	56 years
Lieutenants	53 years

This will have as a consequence the addition of two years on the age limit of Captains and Lieutenant Commanders of the corps of "residence fixe." For all other corps, except the Line, the new age limit will be below that in vogue at present.

Engineering Officers. As compared with the commissioned personnel, the new law calls for the following increase in the Engineering Corps:

Captain	1
Commander	3
Lieutenant Commanders	10

and for a reduction in the Engineering Corps as follows:

Lieutenants	46
Lieutenant (jg)	100

This important reduction in the lower ranks of the Engineering Corps is partially compensated due to the creation of forty-five Mechanic Warrant Officers.

Direct promotion from civil life is also open to the grade of Ensign (Engineering Corps) for young men with Engineering Diplomas from the school of Central Arts and Manufactures. The number of vacancies reserved for this class should not be more than one-fifth of the Ensigns promoted to Lieutenant (jg) during the preceding year.

The number of vacancies reserved for Chief Warrant and Warrants for promotion to Lieutenant (jg) should not exceed one-third of the number of Ensigns promoted to Lieutenant (jg) during the preceding year.

Naval Construction Corps. As compared with the commissioned personnel, the new law calls for the following reduction in the Construction Corps:

Vice Admirals.....	1
Rear Admirals.....	5
Captains	9
Commanders	6
Lieutenant Commanders	2
Lieutenants	20

and for an increase in the Construction Corps as follows:

Lieutenants (jg)	1
------------------------	---

Engineers d'Artillerie Navale. As compared with the commissioned personnel, the new law calls for the following reduction in this corps:

Vice Admirals.....	1
Rear Admirals	2
Captains	5
Commanders	4
Lieutenant Commanders'	9
Lieutenants'	20

and for an increase in this corps as follows:

Lieutenants (jg)	1
------------------------	---

Supply Corps. As compared with the commissioned personnel, the new law calls for the following reduction in this corps:

Rear Admirals	2
Captains	1
Lieutenant Commanders	13
Lieutenants	12

and for an increase in this corps as follows:

Commanders	4
Lieutenants (jg)	8

The course of study at the Commissary School is increased from one to two years.

In case the proposed measures of the bill will be insufficient to bring the commissioned personnel down to the minimum required by the new law, steps will be taken to reduce the excess by not filling vacancies as they occur, except as follows:

For officers of high rank one promotion for each two vacancies that occur.

For officers of the lower grades two promotions for each three vacancies that occur.

We have no need to insist on the inconvenience that will be caused by such a method. It will not only cause a slump in promotion, but the reduction in certain corps will not become effective for a long time. This measure will in the long run be detrimental from an economic standpoint, as well as to the service and the general welfare of the officers.—*Moniteur De La Flotte*, 2 December, 1922.

FRENCH NAVY NOTES.—As 100,000 tons of other fleet auxiliaries are to be provided under the Raiberti program, the French Fleet in 1940 may include just over 700,000 tons of warship displacement, that is about the English battleship tonnage under the Washington agreement. But taking into consideration the actual trend of French naval and Parliamentary opinion, it is safe to say that the 1922 twenty-year program will undergo considerable modifications, *poussière sousmarine et aérienne* being certain to usurp the place allotted on paper to larger classes of ships. The only certainty is as to the yearly outlay on new construction, which will average 300,000,000 francs (hardly £4,000,000 in pre-war value).

* * * * *

Coastal batteries are apparently part of *la Marine Française nouvelle*, and with triumph in his voice, Admiral Guépratte spoke of *beaux canons* of 18-in. bore, in groups of four, to form strategic batteries on selected points of our littoral. The power and range of 1,500-kilo shells are impressive enough, and bomb-proof, aerially-controlled batteries of that caliber perched up on high promontories no enemy battle fleet coming within twenty miles of the French coast could afford to ignore, at least in daytime.

Of course, monster guns, well posted and overlooking narrow straits (Dover-Calais, Gibraltar, (Bizerta), could exercise permanent and even weighty influence; but then smoke-producing and asphyxiating shells and bombs are new and effective antidotes to fixed batteries, and the mistake has been in ignoring those *faits nouveaux*. The fact is that the Marine Française has not changed its methods, and proceeds by fits and starts: the latest craze is the *défense des côtes*, in foolish disregard of secular experience. *Guerre de mouvements* invariably gained the upper hand over *guerre de position*.

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From the discussion in the "Commission des Affaires Etrangères" and the significant declarations by Minister Raiberti, the Poincaré Government has decided, to the surprise and disgust of the majority of French naval men, to ask for the ratification of the "Panama Canal battleship limitation agreement" by the Chambers, and this with the least possible debate, so as to avoid regrettable public criticism of Allied government. Considerations of foreign policy alone have determined that unexpected move: viz., to provide no "handle" for anti-French slanders by the Boche subsidized propaganda, to give to the world an example of respect of international agreement and treaties even when conditionally contracted under circumstances foreign to fair play, and also to avoid lowering the prestige and power of French Premiers (as would be the case if ex-Premier Briand were disavowed).

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Treaties signed France will always ratify and respect, but she claims her sovereign rights in what concerns other classes of defensive vessels, and will not be tricked again into Washington traps. *La France a besoin d'une marine pour défendre son prestige, son empire colonial et sa propre existence. Il faut continuer notre effort, créer l'aviation maritime et organiser la défense des côtes.*" (Minister Raiberti's declarations in the Chamber.)

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The Paris Journal de la Marine *Le Yacht* publishes a timely illustrated article on the *Armement du Croiseur léger*, at the moment when the Raiberti Administration is contemplating the laying down of the three remaining cruisers of the Guisthau program (to be named *Bouvert*, *Cassard*, *Surcouf*), and considering anew the question of size and offensive power. Fine ships, the fastest yet projected, as the Primauguets in hand at Lorient and Brest undoubtedly are (8,000 tons, 100,000 h. p., 35 knots, armored sides over motors), they have a weak point: viz., an inferior armament of eight 6-in. weapons, exceedingly improved *naturellement* and *très supérieurs* to all weapons *ejusdem farinae*; and no amount of literature can make them a match for the British *Raleighs*, that are armed with seven excellent 7.5-in. weapons, nor even for the American *Omahas*, which carry 12 guns of 6-in., firing six ahead. Speed is a splendid asset in cruisers, but it is ephemeral; safety lies in speed and caliber combined, as demonstrated at the Falklands.

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A battery of six guns of 7.6-in. bore is considered adequate for a 10,000-ton cruiser of 34-knot speed, although eight such guns in twin turrets disposed for end-on fire have many partisans. *Le Yacht* successively examines five different ways of distributing the armament. Single gun positions, as in the British *Raleigh*, combine the advantages of all-round volume of fire, reduced vulnerability, and end-on fire, but the disposition affording the best utilization of the armament—five guns axially and six abeam—is one comprizing two amidship turrets en échelons and a single

gun on the bows and stern respectively.—J. B. Gautreau in *Naval and Military Record*, 27 December, 1922, and 3 January, 1923.

GERMANY

THE WASPS' NEST IN FLANDERS.—In a series of articles contributed to the *Marine Rundschau*, Commander E. E. Schulze describes in some detail the work of the German light forces which operated from the bases in Flanders during the war, and, as the writer was attached as senior staff officer to that command, his account may be accepted as authoritative. Referring to the net barrage laid by vessels of the Dover Patrol on April 24-25, 1916, extending from the Scheldt estuary as far as Dunkirk, he pays a tribute to the seamanlike skill with which this work was carried out. He affirms, however, that our patrols only watched the barrage during the hours of daylight, and that as soon as dusk fell they invariably withdrew to Dunkirk. It was therefore a simple matter for the Germans to remove, under cover of darkness, enough of the nets to leave channels clear for the passage of their *U*-boats. Only in the last year of the war was the barrage patrolled at night, and although this, it is claimed, did not prevent sweeping operations from being continued with success, the writer admits that the increased vigilance of our patrols was very trying. "We were particularly worried by the small British motor torpedo-boats (C.M.B.'s), which from the spring of 1917 were more and more in evidence. Their high speed and the difficulty of seeing them made these boats a danger not only to our submarines, which were forced to cruise on the surface in the shallow coastal waters, but to all surface craft as well, and we were therefore compelled to abandon the practice of keeping our destroyers constantly on patrol before the swept channels."

Why the Germans did not themselves make more use of mines and other obstructions in order to render the Flanders coast secure from attack is explained by Commander Schulze. The chief reason was that mines had proved to be as dangerous to friend as to foe, and especially to the *U*-boats, which could never be certain of approaching the coast from a given direction. Thus mine-laying was but rarely resorted to in the Flanders zone, and then only for definite objects—as, for instance, in the winter of 1914-15, when a field was laid off the Scheldt in anticipation of "a British breach of neutrality." The fact that on May 7, 1917, the destroyer *Maori* was mined on the Thornton Bank, north of Zeebrugge, so impressed the British, we are told, that for a long time afterwards they feared mines where none existed.

With the development of the *U*-boat war on trade every other branch of the German naval service was subordinated to the furtherance of this special campaign. In the beginning, however, the possibilities of the Flanders coast as a base for submarine operations were not realized by the German Fleet Command. The first submarine to enter Zeebrugge was the *U 12*, which arrived on November 9, 1914, and was followed some time later by the *U 11*, both boats making several cruises from that base. On March 16, 1915, *U 28* brought the first prize into Zeebrugge. None of these boats, however, was permanently stationed there, and the first to be specially detailed as a unit of the Flanders command was the *U B 10*, which had been put together in Antwerp. The "Flanders *U*-boat Flotilla" did not come into existence till March 29, 1915. Thereafter it increased steadily in numbers and dimensions, until October, 1917, it was found expedient to divide it into two formations. It attained its maximum strength in July, 1917, when thirty-eight boats were in service. These Flanders submarines, we learn, were responsible for sinking 2,554 vessels with an aggregate of some 4.4 million tons, and thus accounted for thirty-

three per cent of the total tonnage destroyed. Their own losses comprised eighty boats, 145 officers, and far more than 1,000 men.

The main value of the Flemish bases for *U*-boat raiding lay in the fact that they were nearer by about 300 miles than the German home ports to the main traffic routes of the Channel, the south coast of Ireland, and the west coast of France, and the distance thus saved on the outward and homeward voyage increased by so much the radius of the boats in the actual zone of operations. True, it was contended by some that this advantage was nullified by the greater danger incurred in passing through the Dover Strait, but according to Commander Schulze that was not so. The proportion of casualties to tonnage sunk was no higher in the Flanders flotilla than elsewhere. Not until the year 1918, when the British, after prolonged and fruitless attempts, at length succeeded in closing the Strait with mines moored at a great depth, thus making submerged navigation almost impossible, did the tale of *U*-boat casualties become so high as to be prohibitive. When that happened the boats were compelled to proceed to their hunting grounds by the north-about route round Scotland.

The writer argues from this that the *U*-boat ruthless war on trade began too late. It was only adopted, he declares, when the prospects of success had already dwindled appreciably, and when the enemy's counter-offensive was becoming formidable. "It is not possible today, any more than it was at the time to offer mathematical proof that the *U*-boat war, begun at the right moment, would have been successful, but that is what every *U*-boat commander and all of us firmly believed. It is in any case the fact that it was begun a year too late. In spite of the limited number of boats, more could have been achieved in the spring of 1916."

This is an article of faith with nearly every German commentator on the war at sea, but it is not borne out by an objective study of the facts. Had ruthless submarining commenced a year earlier it is probable that Allied counter-measures would have been developed as effectively then as they were at a later date, while the far smaller number of *U*-boats in action would have tended to simplify the problem. Moreover, if the *U*-boat challenge brought America into the fray in 1917, it would no doubt have had the same effect in the previous year, and there is no reason to suppose that American intervention in 1916 would have been less prompt and vigorous than it proved to be twelve months later. One may even share German regrets that *U*-boat frightfulness was postponed so long. Had it been adopted in 1916 the war would almost certainly have ended in 1917, the result would have been the same, and millions of lives and infinite treasure would have been saved. Intelligent Germans know this very well, and we may therefore dismiss their laments at the belated introduction of ruthless submarining as propaganda of the "face-saving" variety.

The zone of operations for which the naval command in Flanders was responsible embraced the east coast of England from the South as far north as Flamborough Head, the Channel, the French west coast, the Bay of Biscay, and the southern area of the Irish Sea. It was plotted into large squares, to each of which a *U*-boat was detailed, though without being definitely restricted thereto. Only the mine-laying boats had stringent orders not to deviate from their prescribed route. The imposing dimensions to which the Flanders force had grown by May, 1918, are revealed by a tabular statement of the units it then comprised. There were nineteen destroyers, organized in four half-flotillas, under the command of Commander Conrad Albrecht; sixteen torpedo-boats of the small *A* class; a motor-boat division of seven units; a minesweeping division composed of twenty-four motor boats and four launches; and a

few auxiliary craft. The submarine force of two flotillas had a total strength of thirty-four boats, twenty-two of which were of the *U B* type and the remainder *U C* mine-layers. The whole organization was as perfect as four years of intensive work could make it, all accounts agreeing that the Commander-in-chief, Admiral von Schröder, and Commander Bartenbach, in charge of *U*-boat operations, were officers of conspicuous ability. It will be seen, therefore, that the Dover Patrol had to deal with no mean antagonist. In the light of these revelations, and bearing in mind the comparatively meager resources at their disposal, it becomes a question whether full justice has been done to the work performed by Admiral Sir Reginald Bacon and his successor, Admiral Sir Roger Keyes.—Hector C. Bywater in *Naval and Military Record*, 20 December, 1922.

JAPAN

NEW-TYPE CRUISERS ORDERED BY JAPAN.—When the Washington Conference fixed the limit of displacement for warships below capital rank at 10,000 tons, it was fairly evident that the majority of such vessels laid down thereafter would be of this maximum size. Japan, in fact, at once tore up the plans she had prepared for a series of 7,000-ton cruisers and redesigned them on a basis of 10,000 tons. The first two ships of this formidable class were ordered last fall, and according to information just received from Tokio they are to be commenced early in the coming spring, the one at Sasebo and the other at the Kawasaki yard, Kobe.

They will be the most powerful ships of their type in any navy, far surpassing the American *Omaha* class of 7,700 tons and leaving behind even the 9,700-ton *Raleigh* class of the British navy. They will be over 600 feet in length; sixty feet in beam, and of high freeboard, this latter feature, which is characteristic of all recent Japanese cruisers, giving them fine seagoing qualities. Turbine machinery, with gearing, and oil-fired boilers will enable them to steam at 33½ knots, but when a full supply of oil, ammunition and war stores is on board the speed will probably be brought down to 32 knots. A few of the boilers will be fitted for coal burning.

So great is the fuel capacity that with all burners full these vessels will be able to steam 14,000 miles at moderate speed. Along the sides in way of machinery spaces there is to be strong armor plating which, together with the horizontal deck protection, will interpose at least five inches of hardened steel between the ship's vitals and an enemy's fire. Below the water line the hull is so honeycombed with compartments that the explosion of one torpedo, or even of two, would probably not disable the ship.

The main battery will consist of six 8-in. rifles of high power and long range. They will be mounted in double turrets, two of which will be forward and one aft. As the second turret will be raised to fire over the first, four guns can be trained right ahead, two astern and all six on either broadside. The 8-in. guns are of the very latest model, designed and built in Japan, and are thirty-four feet long. On mountings specially designed for rapid loading, each gun can fire six aimed rounds per minute, and as the shell weighs 250 pounds, the six guns firing on the broadside can discharge 9,000 pounds of steel and explosive per minute.

Besides these six big guns there will be a battery of 4.7-in. rapid-fire pieces on high-angle mounts, enabling the guns to be used against either surface or air targets. Finally there will be twelve torpedo tubes.

Each ship will be equipped for carrying and launching four airplanes. With the exception of some minor fittings, the whole of the material and equipment of the four vessels will be of Japanese manufacture. The

contracts for the first two call for delivery, complete for sea, inside thirty-four months from the date of laying down. The third and fourth representatives of the class have been ordered, but may not be commenced till late in 1923.

When these vessels are completed, Japan will possess a cruiser squadron absolutely unique in battle power and steaming range. The cost per ship is estimated at \$11,000,000.—Hector C. Bywater, in *Baltimore Sun*, 11 January, 1923.

JAPAN DISSATISFIED.—According to a Tokio despatch to *The Times*, dated December 17, "there are unmistakable indications that the Opposition leaders reflect the growing obsession that Japan had given all and obtained nothing at the Washington Conference." The same despatch quotes a professor of the Tokio University as asserting it to be impossible to approve the American attitude while Japan was steadily carrying out the program of naval and military retrenchment agreed to among the Powers. "Japan today has probably gone farther in carrying out the Washington agreements in the letter and spirit than any of the five Powers. The dismantled ships seen on her coast, her reduced naval and military personnel, and her withdrawals from the mainland testify to this."

These statements are not quite in accord with information previously received. Whatever the Japanese public may have been taught to believe, their naval and military authorities are under no illusion as to the immense strategical advantages which the Washington agreement has conferred upon the island Empire. The compact maintaining the status quo with regard to Pacific fortifications has more than recompensed Japan for the reduction of her battle fleet by making her practically invulnerable to direct attack. That agreement alone has rendered her more secure than the complete fulfilment of the "eight-eight" Dreadnaught program would have done, while at the same time she has saved well over 100 million sterling in building costs, to say nothing of the heavy outlay on new docks and other incidentals that would have been necessitated by the execution of the program. The statement that she has given all and gained nothing by the Washington treaties is, therefore, quite untrue. Nor can the assertion that she has gone further than any Power in carrying out the Washington decrees be allowed to pass unchallenged. So far not one of her effective ships condemned under the Limitation Treaty has been scrapped, or even dismantled. It is true that a few of the oldest pre-Dreadnaughts have been broken up, and that the *Kashima*, *Ikoma*, and *Kaurama* have had their turrets removed; but all these vessels absolute, must soon have been discarded in the ordinary course of events. The new battleships *Kaga* and *Tosa*, launched in 1921, are to be used as targets and then broken up—but only if the treaty comes into force. Not a plate has been removed from them as yet. In other words, Japan is following precisely the same policy as the United States in declining to anticipate the naval clauses of the Washington agreement. Great Britain alone has taken that step, and precious little credit she has got for it up to now.—Hector C. Bywater in *Naval and Military Record*, 27 December, 1922.

UNITED STATES

TENTATIVE PLANS FOR WAR COLLEGE COURSES.—Following a conference called on December 14 by Assistant Secretary Roosevelt of the ranking officers of the Navy, a tentative plan has been drawn up.

The proposed plan which may be slightly revised after it has been studied by the other officers who participated in the conference before it is finally approved by the department is as follows:

1. Retention of the present War College at Newport. Admission to it shall be selective, governed by the fitness of an officer to attend the course. This fitness will be determined by appropriate entries on the officer's record made by the reporting senior. Eligibility to attend shall begin with the upper half of commanders.

2. The course at the War College shall be a one-year's course for the majority of those attending, with, however, a two-years' class selected from the most promising of the officers taking the one-year course. The work of the second year will embrace the problems of the higher commands.

3. A school for the training of junior officers in the principles of strategy and tactics and the essential problems learned at a staff college; this school to be under the superintendence of the President of the War College. This is to be known as the Junior College and the course will be one year. Admission will not be selective but shall be limited in general to officers between the upper half of the lieutenant's list and the lower half of the commander's list, inclusive.

4. At every shore station where there are a considerable number of officers assembled, schools for the training of such officers as desire to make use of them. These should be along the lines indicated for the Junior College but entirely on a voluntary basis.

5. Continuation of the present correspondence school emanating from the War College as it is being conducted, making it available for any officer, ashore or afloat, who desires to take it.

6. The school of the Fleet for the purpose of giving instruction to each officer in the elementary principles of strategy and tactics which should be considered as a part of the regular routine work of each major unit of the fleet. This work to be under one competent officer in each ship and supervised by the fleet tactical officer.

7. Establishment of a Fleet School at home bases where forces of the fleet assemble periodically or are regularly stationed as at San Diego or Charleston. These schools would serve the purpose of instructing all officers of the force, particularly in the problems relating to the force and also in those joint fleet problems relating to the methods of war afloat. They should be available to all officers of the fleet through proper interchange.

8. When opportunity presents itself for the commander-in-chief, through appropriate officers, to indoctrinate, in conferences, such officers of his force as he deems desirable, with his views, his estimates, his decisions and his critiques of the fleet maneuvers conducted.

9. That the Naval War College and the Army War College maintain close touch and intimate co-operation. To this end a reasonable number of naval and army officers should be assigned to the other college. The establishment of a limited naval course at the Army College and a similar war course at the Naval College, under interchange instructors, is also recommended.—Abstracts from M. H. McIntyre in the *Providence Journal*, 21 January, 1923.

WANTS MARINES TO STAY.—Managua, Nicaragua, December 20—President Diego Manuel Chamorro in his annual message to Congress, supports the Central American conference at Washington as a means toward peace and prosperity. He favors continuance of the legation guard of American Marines, which, he says, remains with the consent of the Nicaraguan Government and is in no way connected with the civil and political life of the country.

The president commends American co-operation in the financial rehabilitation of Nicaragua, strongly refuting charges that it tends toward intervention in the sovereignty of the country.—*Boston Evening Transcript*, 20 December, 1922.

ARGENTINE OBJECTS TO BRAZIL NAVAL MISSION.—*La Prensa*, one of the leading South American newspapers published in Buenos Aires, takes exception in a recent editorial to the action of the United States in sending a naval mission to Brazil. The paper declares that the mission being sent and officially recognized by the United States, serves a notice to the South Americans, especially the Plate republics, that Brazil has the support of the United States in her military policies. The publication also asserts that Brazil is preparing for a future offensive or defensive movement.

The paper stresses the fact that Captain Vogelgesang is in command and that he previously accompanied a diplomatic mission to Brazil, referring to the recent visit of courtesy made by Secretary Hughes to the international exposition. *La Prensa* says that the United States cannot be ignorant of Brazil's published program, which includes the acquisition of large naval units, the construction of five military bases and other preparations, nearly all of which are along the Argentine and Uruguayan frontiers.—*The Naval Monthly*, January, 1923.

AMERICA'S OUTPOST IN THE PACIFIC.—A broad-gauged and scientific policy for the development and maintenance of shore establishments for the American Navy has been submitted to Secretary Denby by the special board headed by Rear Admiral Hugh Rodman, ranking American flag officer in the North Sea during the World War, appointed last fall to determine what naval bases, yards and stations are necessary to the maintenance of the efficiency of the fleet and its operation in peace and war.

The general plan of shore establishment recommended by the Rodman board contemplates six primary bases for the use of the fleet, two of which would be advance bases in the Hawaiian Islands and the Canal Zone, the development of secondary bases at San Diego, in Alaska, the Eastern West Indies, the Key West region, the Boston-Portsmouth region and at Charleston, and lays down a definite and stable policy with respect to the retention or abandonment of navy yards, air and radio stations and other naval shore activities.

In regard to the Hawaiian Islands the Board says an advanced base should be developed on Oahu capable of serving the entire fleet to the maximum, subject only to the natural limitations imposed by the size and character of this island. This project will necessitate the development of Oahu Island to the maximum and probably the dredging of Kaneohe Bay, as Pearl Harbor alone is not adequate to serve as a Pacific advanced fleet base, and the use of any other anchorage in the Hawaiian Islands in war is open to grave objections. This advanced base should have priority of development over the fleet bases.

By the joint development of Pearl Harbor, Honolulu Harbor and Kaneohe Bay there could easily be developed in Hawaii facilities for a fleet of a thousand vessels. As the "cross-roads of the Pacific," experts are agreed the United States should lose no time in exploiting its possibilities to the limit. Oahu, besides being an impregnable Navy base, could become the principal garrison of the United States Army, with a permanent force of 25,000 troops. Their function exclusively would be to serve as the defenders of the fortress in case of an attack requiring close-range fighting. Their numerical strength, of course, always would be too insignificant to count as an expeditionary force for offensive operations further afield.

Would Defend Pacific Coast

Oahu's chief bulwark would be its fortifications, its long-range guns, its mined approaches and its floating strength in the form of warships of all types. With a supplementary equipment of aircraft it would completely fulfill its two basic purposes—to hold at bay assailants who came by sea or air to attack the western coast of the United States, and to be a sally port for American forces.

At Pearl Harbor there now are a naval station, a one thousand-foot dry dock and repair facilities for ships of the largest size. To carry out the Oahu scheme there will need to be considerably more extensive berthing space, shop, warehouse, and storage facilities and extensive dredging operations. Oahu could be converted into a vast coaling station and contain immense oil reservoirs for the fueling of American merchant ships plying Pacific trade routes or crossing that ocean to or from the Panama Canal.

As a half-way house (2,100 miles from San Francisco and 3,500 from the Philippines) Oahu is ideally situated for the purposes of an international fuel depôt. If ships of the American merchant fleet or other marines can refill coal bunkers or oil tanks at our Hawaiian base, each and every one of those vessels can carry correspondingly heavier cargoes, using for them space otherwise needed for fuel.

In the Canal Zone an advanced base for repair and supply of vessels in transit, utilizing Canal Zone facilities as far as possible; a submarine and aviation base should be developed. In this connection it should be borne in mind that in the future the Canal Zone may play a part only slightly, if any, inferior to that of our main bases. For this reason the development of the Canal Zone as an advanced base must be considered as a naval base development project of the future. This advanced base takes priority for development after the four main bases.

Proposes Station at Alameda

Secretary Denby instructed the board to report also what additional stations might be necessary for the effective operations of the fleet in peace and in war. The only additional station recommended which falls completely within this description is the proposed naval base at Alameda, on San Francisco Bay.

"The base at Alameda," the Board states, "when supplemented by all other existing naval activities in San Francisco Bay, including the Navy Yard at Mare Island, should be capable of serving the entire fleet in all respects. Land in addition to the Alameda site will have to be acquired on San Francisco Bay for a mine base. The Board's recommendation that a marine storehouse be built in San Francisco contemplates that Government-owned land is available for a site."

The Rodman board urges that at least two adequate fleet bases should be maintained on each coast. Its survey of the situation has resulted in the recommendation that on the Atlantic Coast one of these fleet bases should be established in Chesapeake Bay and the other in the New York-Narragansett region. San Francisco Bay and Puget Sound are recommended as the ideal locations for the primary fleet bases on the Pacific Coast.

Naval Policy Study

American naval policy as determined by national policy was studied by the Rodman Board, which recognized that on the naval policy of the Government depended the size, composition and purpose of the naval establishment and its proposed utilization in peace and war, together with the merchant marine in war. Consideration also was given to the size, com-

position and proposed use of the naval forces in war and the organization, allocation and operation of the fleet in peace.

"The shore establishment for the service of the fleet," the board reported, "and its existence and efficient operation are essential to the very being of the fleet, both in war and in insuring material readiness in peace. War on the sea is conducted by floating naval forces, but they draw their sustenance from bases. The periodic return of units of the fleet to the bases is inevitable, the service rendered by the bases must be highly efficient, as the issue of the sea campaign may depend upon the complete readiness of the fleet to keep the sea."

Considering the general principles underlying the selection of sites for naval bases and stations and their missions, which rarely change, the board emphasized the fact that new international situations do change naval strategy and policy, and declared such changes require corresponding changes in locations and mission of naval bases if maximum efficiency was demanded.

Lays Down General Lines

The Rodman Board lays down the following broad lines of policy for naval shore establishments:

"The location and mission of naval stations and the necessity for the establishment of new naval stations are dependent upon considerations of strategy, which are in turn, dependent upon existing naval stations, and should be abandoned until the application of this policy shows that it will not contribute in peace or in war to the maintenance of the efficiency of the fleet or its effective operation.

"As the successful operation of the fleet is dependent upon adequate shore bases and stations, the development of which is second in importance only to the development of the fleet, the development of the shore establishments must be carried out on a definite program to complete all essential bases and stations in a given number of years.

"In time of peace the stations of the shore establishment should be maintained on an operating basis only to the extent necessary to support the fleet in those necessary naval operations conducted alike in peace or war. The stations that are reduced in activity or made inoperative must be maintained in condition quickly to be made fully operative in time of impending hostilities."

Primary consideration was given by the board to the subject of the main fleet bases to be operated.

"The problem confronting the board in making recommendations as to such bases would have been greatly simplified," it says, "if it were possible to create the ideal condition of having at least two adequate fleet bases on each coast, namely the New York-Narragansett Bay region and Chesapeake Bay on the Atlantic, and San Francisco Bay and Puget Sound on the Pacific, with advanced bases in the Canal Zone and Hawaiian Islands, and to concentrate naval shore establishments in and around these waters.

"The general policy followed at the time when most yards and stations were established was one of coast or local defense, so that more navy yards have been established than are required for fleet bases, and some are in places not adapted for development into bases. The board, realizing the fact that the ideal condition does not obtain, must accordingly make its recommendations to utilize the yards and stations now in existence to the best advantage from the standpoint of utility and economy, and having in mind always the general policies hereinbefore laid down."

The board, therefore, recommended the development of bases, arranged in the order in which they should be developed as follows:

"San Francisco Bay—A base capable of serving the entire fleet in all respects. To include all existing naval activities in San Francisco Bay and its tributaries. The board concurs in the recommendations of the Helm Commission in reference to Mare Island, except the establishment of submarine and aviation bases there, and also the recommendation of the Ball Committee, particularly in reference to the establishment of a naval base on San Francisco Bay at Alameda. The board believes that this latter is imperative.

"Puget Sound—A base capable of serving the entire fleet in all respects. To include all naval stations in the Puget Sound region."

Would Dredge Hell Gate

"New York-Narragansett Bay region—A base capable of serving the entire fleet in all respects. To include all stations now located in New York Harbor, Long Island Sound and Narragansett Bay. To make this base effective, Hell Gate must be dredged to permit the ready passage of the largest vessels from Long Island Sound to New York Harbor.

"Chesapeake Bay—A base capable of serving the entire fleet in all respects. To include all stations now located in Lower Chesapeake Bay and its tributaries.

"The development of the other fleet bases, advanced bases and secondary bases will, in some instances, probably involve the acquisition of additional property or other extensive development work, such as the dredging of Hell Gate, which is recommended as a part of the development of the New York-Narragansett Bay base. The development of this base will also necessitate the acquisition of wharfage facilities for the naval supply depot, South Brooklyn, and of a site for an air station if Rockaway Beach cannot be retained."

Most of the navy yards are included in the bases recommended by the board. Of the other yards and stations the report favors the retention of those at Philadelphia, New Orleans, Washington, Newport, Guantanamo Bay, St. Thomas and Culebra.

Order of Reductions, if Necessary

The order, by groups, in which it is recommended that navy yards and stations should be reduced in activity or made inoperative, should conditions of economy require such action, based on conditions as they exist today, is as follows:

Group 1—Key West Naval Station; New Orleans Naval Station.

Group 2—Boston, Charleston and Portsmouth Navy Yards.

Group 3—Philadelphia, Navy Yard.

Group 4—Mare Island, New York, Norfolk, Pearl Harbor and Puget Sound Navy Yards.

The report recommends that the four main and two advanced fleet bases, besides facilities for operation and maintenance of destroyers, should have special facilities for serving submarines. It suggests the sale of the submarine base at Squantum, Mass.

The board recommends retention of the naval air station at New York, saying that if the present site at Rockaway Beach cannot be kept a new site should be provided.

To Retain Radio Stations

Important recommendations are made with regard to naval radio stations, most of which are to be retained, although the abandonment or transfer of twenty is recommended.

The naval radio station is declared to be an integral part of the navy, which must be maintained and operated during peace in such a way as to be of the greatest value in time of national emergency.

Concerning radio compass stations, the report says their utility to commerce demands that they be established "at all important seaports as well as at points of importance solely to the fleet."

"The development of radio telegraphy is so rapid and the administrative considerations which govern the operative status of present stations and the creation of new stations are subject to such frequent change," says the report, "that the board makes no recommendation as to reducing the operative status of any existing station or the development of new stations. However, there are some stations which are not considered necessary, and which should be abandoned. All other radio stations should be retained."

The Board considers that three training stations, one on the Atlantic, one on the Pacific and one on the Great Lakes—are necessary. It recommends that training activities on the Atlantic coast be centered at the Newport Naval Training Station and that the training station at the Hampton Roads naval operating base be closed.

The Board recommends that the torpedo station, Alexandria, Va., be continued for the present, but ultimately transferred to the torpedo station at Newport, R. I., and that the temporary torpedo depot at San Pedro be moved to San Diego. It finds all other torpedo depots necessary.—*Boston Transcript*, 20 January, 1923.

MERCHANT MARINE

SUBSIDY BILL LAID ASIDE.—The ship subsidy bill was temporarily laid aside in the Senate last Friday to allow consideration of the naval appropriation bill. On the two days preceding Senators Harrison of Mississippi and Dial of South Carolina spoke against the bill, while Senator Calder of New York earnestly advocated its passage. In the course of his long address he reviewed the history of the merchant marine of the United States from the earliest days until the entrance of the nation into the World War and the resultant ship construction program.

Discussing the value of a merchant marine as a naval auxiliary, Senator Calder pointed out that Great Britain's merchant fleet contains 194 vessels capable of a speed of over fifteen knots, while the fleet of this country contains only fifty such vessels. These vessels, he pointed out, are the "second line of defense" and give Great Britain the naval supremacy over this country in a four to one ratio.

The subsidy bill remains the unfinished business before the Senate. Senator Jones of Washington, who is in charge of the measure, has announced, however, that he would move to lay it aside and take up rural credits legislation as soon as a bill providing for the relief of the farmers is reported to the Senate from the Committee on Banking and Currency.—*Nautical Gazette*, 30 December, 1922.

REVISION OF NAVIGATION LAWS URGENTLY NEEDED.—According to Secretary of Commerce Hoover, the result of the attempted revision and codification of the navigation laws of the United States undertaken by the Shipping Board in conjunction with the Department of Commerce will be laid before Congress during its present session. They include a marked simplification of the administration and supervisory work of Government agencies in charge of shipping.

Of the need of such revision Commissioner of Navigation Carson says in his report for the fiscal year 1921-22 that at present there is scattered throughout the Treasury, War, and Commerce Departments the administration of laws having to do directly with the movement of our merchant

fleet and safeguarding the lives of thousands on board those vessels. This results in an unnecessary duplication of the floating equipment and officers of the Federal Government with the necessary duplication of expenditures.

During a recent investigation of the conditions in the harbor at New York it was found that the Coast Guard service was operating six small vessels in those waters enforcing the anchorage regulations, boarding of vessels, and to some extent enforcing the navigation laws. The supervisor of the harbor, acting under the Secretary of War, was employing six vessels of a similar size in the enforcement of the dumping regulations. The Public Health Service was operating four vessels of a similar size in connection with the quarantine station at Rosebank, one of them being a fumigating vessel. The cost of the above services aggregates approximately \$270,000.

In addition to the above, this bureau has stationed at New York during the greater portion of the year a small motor boat engaged in the enforcement of the navigation laws at an expense of approximately \$15,000. The work performed by the above services having to do almost exclusively with the merchant marine, obviously should be under the direction of one department.—*Nautical Gazette*, 23 December, 1922.

FRENCH MOTOR-SHIP OF 22,000 TONS.—A merchant ship for the French Merchant Marine is being constructed at the yards of Fairfield Shipbuilding and Engine Company, Glasgow, Scotland.

Dimensions of ship

Displacement tonnage.....	22,000
Length	184 metres 61
Beam	22 metres 15

Engine Installation

Diesel motors	2 cycle
Type—Marin Sulzer	12,000 h.p. (total power)

Various Details of Engines

Number of motors	4
Power (each one).....	3,000 h.p. effective
Bore of cylinder	70 cm.
Stroke	98 cm.
R.P.M.	130
Number of cylinders par motor	6

Consummation of fuel oil per h.p. per hour 185 grammes. The scavenging is done by Turbo blowers.—*Press Reports*.

ENGINEERING

THE THEORY OF LUBRICATION.—General reasoning is so often at fault as almost to justify the conclusion that general reasoning is generally wrong. * * * Some engineers, after a cursory study of Osborne Reynolds' theory of lubrication, decided from general reasoning that the conditions on which it was founded were seldom realized in practice, basing their conclusions largely on the circumstance that, according to Reynolds' theory, the frictional resistance developed depended on the viscosity of the lubricant, whilst practical experience showed that the actual coefficient of friction, even in a fully-lubricated bearing, was nearly the same whatever the lubricant used.

The fallacy of this argument was very thoroughly exposed in the able and interesting Thomas Hawksley lecture delivered to the Institution of Mechanical Engineers last Friday evening by Dr. Stanton, of the National

Physical Laboratory. What Reynolds' critics had overlooked was that, according to the theory, the friction of a bearing, was also a function of the thickness of the oil film, and, with stated conditions of load and speed, this thickness was less the less the viscosity of the lubricant. Dr. Stanton gave in his lecture the results of a calculation of the frictional resistance of a bearing run at the same load and at the same speed with different lubricants. When the viscosity of the lubricant was 0.233 the calculated coefficient of friction came out as 0.00094, whilst when the viscosity was 0.824, or nearly fourfold, the coefficient of friction was 0.00099, or only some five per cent more.

The very careful and ingenious experiments described in the lecture very thoroughly vindicate the wide applicability of Osborne Reynolds' theory, but at the same time thoroughly substantiate the objections raised to the policy of the Committee on Lubricants in attempting to experiment on an ordinary journal bearing. It appears from the lecture that all the troubles anticipated by the opponents of this course were encountered, and that it was impossible to obtain figures sufficiently accurate for a comparison with theory, until the attempt to reproduce practical conditions was abandoned, and in the end it was found expedient to make the bush six per cent larger than the journal, so that the effective bearing area subtended but some twenty degrees.

* * * * *

On this head much misapprehension prevails. Some engineers have got obsessed with the idea that for lubrication to be effected on Osborne Reynolds' principle it is necessary for oil to be "dragged in" between the opposing surfaces. As a matter of fact the oil pressure that keeps the surfaces apart is due to the objection of the oil to be extruded from between them, and hence, if a cylinder rolls over an oil covered plane, lubrication is effected on Osborne Reynolds' principle just as much as it is in the case of a journal, although there is no "dragging in" of the oil. In short, the oil film is already there, and before it can be extruded the cylinder has rolled on a point where the film retains its original thickness.

In Dr. Stanton's experiments the maximum pressure observed amounted to about three and one-half tons per square inch, the lubricant being castor oil, and the least thickness of the oil film was found to be 0.000046 in. It is interesting to compare these figures with the corresponding values for the film between the teeth of marine reduction gears, as determined by calculation and tabulated on page 453 of our issue of October 15 last. In the case of the *S.S. Melmore Head* the computed thickness of the oil film was 0.000035 in., and the maximum pressure in the film 23,100 lbs. per square inch. In general, however, the average film thickness turns out to be somewhat greater than that found in the Teddington experiments which is in part due to the better lubrication due to the rolling motion, although the "effective" curvature of the opposing surfaces is also a factor in the problem, as is also the relative speed.

The high pressures at Teddington were obtained with castor oil and with heavy cylinder oil. When the attempt was made to carry the same load with lighter oils, such as sperm, the vibration became so great that the experiment had to be abandoned for fear that "seizing" might occur and the bearing be spoiled. The exact converse of this is reported to have occurred with certain high-speed bearings of large diameter, in which the surface speed was of the order of 100 ft. per second, and the clearance between brass and journal 4 mils per inch. In this case it is stated that heavy vibration occurred until the oil warmed up, thereby reducing its viscosity. On this condition being attained the bearing ran steadily and quietly. Unfortunately, complete data are not available, and it is not clear whether the vibrations were encountered merely in running up to speed

or continued afterwards. If the first-named hypothesis be correct, the explanation may possibly be found in the fact that, with a bearing at rest, the least distance between brass and journal is at the bottom of the brass, but in the stable running position the point of closest contact lies to the trailing side of the brass, and to attain to this position it is necessary for the shaft to be lifted. This operation does not in all cases appear to be effected quietly as the shaft after beginning to lift, sometimes slips back again, and it is only after a certain speed is attained that quiet running is achieved. It is at least conceivable that the vibrations noted, when it was attempted to run the Teddington bearing with light oils and heavy loads had a similar origin, but other explanations are certainly possible.

One very important observation at the National Physical Laboratory was that, provided the journal was run up to speed before the load came on, there was no wear of the brass, the two solid surfaces being completely separated by the film of oil. Another highly important conclusion reached was that "seizing" might occur whilst the oil film was still very many molecules thick. This observation accords very well with the view repeatedly advanced in these columns: viz., that lubrication fails and a bearing seizes, when the shear stress on the oil exceeds a certain limit, which depends on the physical properties of the oil and of the bearing metal. In order that oil may be dragged in between the opposing surfaces it must adhere to them, but the strength of the bond will vary with the lubricant and with the metal. Should the shearing forces developed in the film exceed the strength of this bond slip will occur and, the pressure being no longer maintained, the opposing surfaces will come into contact and "seizing" occur. A rise of temperature may be expected to weaken the bond and to promote "seizing," the more specially as at the same time the viscosity of the lubricant will be diminished, thus thinning the film and increasing the shear stress. On this view the superiority as lubricants of animal and vegetable oils lies in the fact that they form a stronger bond with the bearing metal than do the mineral oils, a fact which Mr. R. M. Dally appears to have been the first to observe.—*Engineering*, 8 December, 1922.

LEAKS, caused by corrosion, in a large water main in America were stopped by electric welding without cutting off the water, which had a pressure of 90 lb. per square inch. The process, described in the *Engineering News-Record*, was as follows: Where a hole in the pipe was discovered the flow of water was stopped with a pine plug. The plug was then cut off flush with the surface of the pipe and covered with a metal cap held fast by tacking it on the side with an electric arc. The cap used was of metal of approximately a No. 11 gauge and was slightly concave. Over this cap metal was welded, extending far enough to get a firm hold on the pipe.—*The Engineer*, 8 December, 1922.

ELECTRICAL INSTRUMENT APPLIED TO MEASUREMENT OF FLUIDS.—In measuring the flow of steam or other fluids, the application of electricity has been in use a number of years and its advantages are well recognized. The one apparent objection to electrically operated flow meters has been the error due to fluctuations in the voltage of the lines from which they are operated. Where the voltage varies uniformly over a moderate range—for instance, from 108 to 112 volts—the electrical instruments can be set for a mean value, say 110 volts, and the average result over a period of time will be sufficiently accurate for practical purposes.

However, in many cases it is impossible to obtain an average voltage with sufficient accuracy, owing to poor voltage regulation or other conditions not under control. It is for this latter group primarily that the writer has developed an electrical integrating instrument that is practically

free from voltage error. This instrument is as simple as the ordinary alternating-current watt-hour meter and equally dependable, if not less likely to get out of adjustment.

The instrument is not a watt-hour meter, neither is it an ampere-hour meter. Considered as an electrical instrument, it sums up, or integrates, the conductance—that is, the reciprocal of the resistance—of a circuit with respect to time, and therefore might be called an integrating "mho-meter." When used in connection with a device by which the electrical conductance increases (and the resistance decreases) as the rate of flow of a fluid increases, the instrument becomes a fluid flow integrator or totalizer.

Without using mathematical equations, the elementary principles of this instrument may be set forth and its chief characteristics explained by refer-

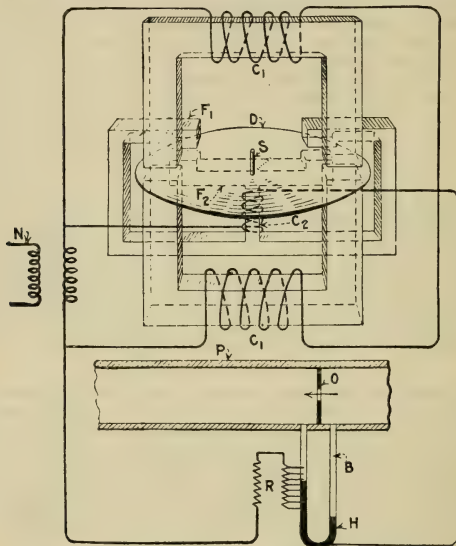


FIG. 1. WIRING DIAGRAM SHOWING ACTION OF INTEGRATOR

ence to the diagrammatic drawing, Fig. 1, and to other instruments whose principles are well known. In the diagram an aluminum disk D mounted on the shaft S rotates in the air gaps of two pairs of electromagnets having the winding C_1 and C_2 , respectively. The coils C_1 are connected in series with each other and across the secondary of the transformer N . The coil C_2 is connected in series with the resistance R , the two being across the secondary of the transformer in parallel with the coils C_1 .

Pipe P carries the steam or other fluid to be measured and the orifice O causes a pressure drop, or differential pressure, between the two sides of the orifice. The differential pressure raises the mercury in the U-tube B , the mercury thus short-circuiting more or less of the resistance R . By

construction, the resistance of the circuit through C_2 and R can be made to vary inversely (and the conductance directly) as the rate of flow of a fluid at constant density.

The coils C_1 contain a large number of turns and are highly inductive, for which reason the lag of the current behind the voltage approaches ninety degrees. The coil C_2 , however, has a smaller effective number of turns, and being in series with the resistance R , which is large in proportion to the inductive reactance of the coil, the inductive effect of C_2 is practically negligible and the current is nearly in phase with the voltage. Since the currents in these two coils have a large and practically constant phase difference, the corresponding magnetic fluxes of F_1 , and F_2 react on currents induced in the disk to produce a torque thereon in a manner similar to that of the ordinary induction-type watt-hour meter. This accelerating, or driving, torque varies as the product of these two fluxes, a relation well known and used in all induction-type meters. A change in frequency may tend to modify the torque, but this tendency has been rendered negligible for the usual frequency fluctuations by incorporating in the meter, as manufactured, special features not here shown without in any way departing from the fundamental principles under discussion.

As the disk rotates under the action of the driving torque, it cuts across the fluxes of F_1 and F_2 and by this movement has currents induced in it which oppose the motion and thereby give a retarding, or dragging torque. This action is similar to that in a watt-hour meter where one or more permanent magnets, sometimes called drag or damping magnets, provide the retarding torque. By construction the flux of F_1 is made so large in comparison with the flux of F_2 , that the retardation is due almost entirely to the flux F_1 . Thus the electromagnet with the windings C_1 functions in a manner similar to the permanent magnets of a watt-hour meter in giving the retarding torque and at the same time does its part in producing the accelerating torque. This retarding action varies directly as the speed of the disk and as the square of the flux and therefore as their product, a relation applying to the permanent magnets of watt-hour meters or to any magnet whose flux is cut by a conductor forming a closed circuit.

Referring again to the relation that the driving torque varies as the product of the two fluxes of F_1 and F_2 , it will be seen that, for any fixed value of R , F_1 and F_2 , will each vary directly with the voltage from the transformer N . Hence the accelerating torque varies practically directly as the square of this voltage. It also follows that the retarding torque, since it varies as the square of the flux F_1 , likewise varies as the square of the voltage. Neglecting friction on the disk, which is very slight, the speed will take such a value that the accelerating and the retarding torques will be equal and opposite; and since each varies practically in the same way with the voltage, ordinary fluctuations of voltage will have substantially no effect on the speed of the disk. This is a condition desired, for the reason that the velocity of the fluid in the pipe P has no connection with changes in voltage of the transformer N .

By construction, as previously mentioned, the resistance R is made to vary inversely, and the conductance of the circuit directly, as the rate of flow of the fluid to be measured. But the current in the coil C_2 , and hence the flux of F_2 , varies directly as the conductance and therefore directly as the rate of flow of the fluid. The driving torque increases as the flux of F_2 increases, hence the speed of the disk will be proportional to the velocity of the liquid through the orifice. Any changes in F_2 , caused by fluctuations in voltage will be accompanied by corresponding changes in F_1 so that the accelerating and the retarding torques will be equally affected and the speed of the disk will vary only with the rate of flow of the fluid.

Obviously, if the speed is proportional to the rate of flow, the total number of revolutions of the disk is a measure of the total quantity of the fluid passing through the orifice. These revolutions are counted by the usual gear trains with dials, so that the dial indications give a direct summation or integration of the total flow in any desired units.

This integrating instrument has been adopted by the Republic Flow Meters Company, of Chicago, and is now standard equipment, replacing the type formerly used.—E. H. Freeman in *Power*, 26 December, 1922.

NEW BRITISH MAGNETO.—This new magneto is dust-proof and water-tight with the extremely light weight of six and a half pounds in which the magnet, not the armature, rotates. Special fan-shaped stationary pole shoes are used with the construction of the rotor shoes achieving an effective lamination of the magnetic structure which is superior to the best rotating armature construction. This arrangement is supposed to account for the excellent starting characteristics of the new machine and the greater range of speed than called for in service. The firing is claimed to be effective at such slow crank shaft speeds as fifty to sixty revolutions per minute at which speeds effective carburation is not achieved. The use of the stationary armature enables a thorough provision for insulation and the elimination of such evils as rotating high tension winding condenser connections.—*Tech. Engineering News*, January, 1923.

THE DISCHARGE OF OIL FROM SHIPS.—From Monday of this week henceforward, it will be an offense for a ship to discharge oil, or allow it to escape, into the sea within a distance of three miles from the British coast. The Act of Parliament under which such a proceeding has been made punishable with a fine of £100, should serve to remove a just cause of grievance expressed by many visitors to and users of our seashores, for within recent years great discomfort and damage have been caused to many interests by the oily scum or tarry matter which has been washed landwards from ships using oil fuel when cleaning their bunkers or replacing their ballast water. The Act applies not only to ships, but to the discharge or escape of oil from any place on land or from any apparatus used for transferring oil to or from a ship, and definitely forbids its transference during the night time. From our own experience, we know of two places at which the trouble now guarded against has reached acute conditions. At one the oily drift has practically eliminated all off-shore fishing, and at the other the tar deposit has rendered the beach almost useless for pleasure purposes.—*The Engineer*, 5 January, 1923.

THE CONTRA PROPELLER.—This article forms a very comprehensive treatment of the development, recent experience with, and technique of the contra propeller. The pre-war development was restricted to the early work of Dr. Wagner, who in 1912 published the results of trials on a German torpedo boat in which, at a speed of 28 knots, a saving of twelve per cent in power was effected by the introduction of the contra propellers. The war interrupted the development, but since the war considerable progress has been made. Savings of power ranging from ten to twenty per cent have been repeatedly proved on service, and many complete details of actual trial data are given. In the *Stecknitz*, belonging to the Norddeutscher Lloyd, carefully carried out trials were made in the spring of 1920. First the vessel was tried with its old propeller; next, as this propeller was inefficient, a new propeller was fitted with a resultant saving of power of seven to eight per cent. Then the guide blades were attached and the result was a further saving of fifteen per cent. Trials on the Brevik mile of the Norwegian vessel *Hovmøy* of 1,300 tons d.w. carried out under the technical superintendence of Professor Mørch of Trondhjem

University, showed the astonishing saving of seventeen and two-tenths per cent. The Norwegian steamer *Granit*, of 1,000 tons d.w., showed a saving of fifteen to sixteen per cent. The case of the Norwegian passenger vessel *Brevik*, which owing to its age could not maintain its speed on service is interesting, for when fitted with the contra propeller the necessary speed was easily obtained. The Norwegian vessel *Neptun*, of 1,200 tons d.w., first had its old propeller removed and a new one installed with a resulting improvement of six to eight per cent. The fitting of the guide blades resulted in a further saving of eleven and six-tenths per cent at 11 knots and sixteen per cent at 12 knots. In the Norwegian vessels *Ottar* and *Frednes*, which were fitted with guide blades, no definite comparative trials were run, but in the case of the *Frednes* a saving of coal consumption of ten and seven-tenths has been made. In the S.S. *Eikland*, of 2,040 tons d.w., a saving of eleven and five-tenths per cent was obtained. The Hamburg Amerika liner vessel *Andalusia* showed a saving of twenty per cent over the performances of its sister ships *Alesia* and *Arabia*. Altogether eight applications of the propeller have been fitted. Fourteen vessels up to a deadweight of 8,000 tons are yet to be fitted. An objection which at first was thought to be a serious one—that of the breakage of the blades—has not proved so on service. Only in one case, that of the *Andalusia*, has a blade been broken. In this case one of the blades was severed at about its half length, but strangely enough the saving in power was not adversely effected. This accident lead to experiments being carried out on the problem at the Hamburg Experiment Tank, the results of which showed that the diameter of the guide blades could be considerably less than that of the main propeller without destroying its beneficial influence. This reduction of diameter will considerably increase the safety and strength of the guide blades. An interesting feature of the contra propeller is that it increases the maneuvering qualities of the vessel to which it is attached. In the case of the *Neptun* the tactical diameter was reduced to five-eighths of its former value. Detail plans of actual contra propellers are given with the articles, and their routine construction is carefully gone into. The final portion of the article is devoted to the theory of the contra propeller, and the treatment, based upon the latest and most reliable theories, shows that the savings which have been realized in practice are of the order which theoretical investigation leads one to expect.—*W. Kucharski, Werft Reederei Hafen*, November 22, 1922, p. 715; 18 pp.; 18ff.—Abstracted for the *Marine Engineer and Naval Architect*, January, 1923.

AERONAUTICS

STRENGTH OF AIRCRAFT SQUADRONS—According to a recent weekly operations report of Naval Aviation the Aircraft Squadrons attached to the Battle Fleet had the following number of planes in active commission:

Observation Plane Squadron 1—Five *Vought* and three *DH4B*.

Observation Plane Squadron 2—Six *DH4B*. (Six *Vought VE7SF* planes in commission for training.)

Fighting Plane Squadron 1—Three *VE7SF*, one *VE7T*, one *VE7GF* and one *JN4H*.

Fighting Plane Squadron 2—Five *JN4H*.

Torpedo and Bombing Plane Squadron 2—Six *F5L* and two *N9*. (Two *F5L* for replacement.)

The Aircraft Squadrons, Scouting Fleet, consist of Scouting Plane Squadron 1 (*F5L* planes), Torpedo and Bombing Plane Squadron 1 and Kite Balloon Squadron 1.—*Aviation*, 25 December, 1922.

EUROPEAN AIR STRENGTH.—The present relative strengths of the air forces of this country, France and Belgium, now stationed in Europe,

have been revealed in a written reply supplied by the Secretary for Air to Lieutenant Commander Kenworthy. It appears that while we have serving in Europe, fifteen squadrons of twelve machines each, France has 100 squadrons of nine machines, and Belgium fourteen of ten machines each. Our total active service strength is thirty-two squadrons, as compared with 128 for France and fourteen for Belgium. The *personnel* of the Royal Air Force serving in Europe includes 1,158 trained pilots, seventy-five observers and 19,421 other ranks engaged on ground duties. France has made provision for maintaining in Europe 3,039 flying officers and 30,477 other ranks. Information is not available as to how the first of these figures is divisible as between pilots and observers, while in the case of the second the figure excludes a large number of those engaged on ground duties who are obtained from the army. The Belgian total establishment is 2,000 of all ranks, but reorganization is now being undertaken. In the course of a reply to Major Attlee, the Minister stated that the number of machines on the French Civil Register on December 1 was 660, and that during the first eleven months of this year the French aircraft industry had produced 3,300 machines for civil or military purposes, including those exported to foreign countries.—*The Engineer*, 29 December, 1922.

PILOTLESS PLANE SAFE FROM ENEMY CONTROL.—Pilotless bomb-carrying airplanes controlled by wireless will be the most dangerous weapon in future wars, says the French inventor of wireless instruments, Branly, who insists that French apparatus has been developed to such a point already that it is impossible for enemy wireless experts to interfere with control. Not only would an enemy be obliged to know every secret wave length used, but the French controls under experiment were so delicate that special and intricate signals could be so sent as to operate directly many small parts of mechanism.

"As a result," says Branly, "the enemy would have to have full knowledge of the mechanism used, and this can be changed every time the plane leaves the aerodrome; and stolen secret codes henceforth will be useless. Of course, parasite waves could be sent out in all directions, which might make our control more difficult, but under such conditions the enemy would be interfering with his own wireless also."—*Aerial Age*, January, 1923.

SEVEN HOUR GLIDING RECORD.—Lieutenant Thoret, a French military aviator, on January 3 beat all glider records by keeping in the air 7 hr., 3 min. at Biskra, Algeria.

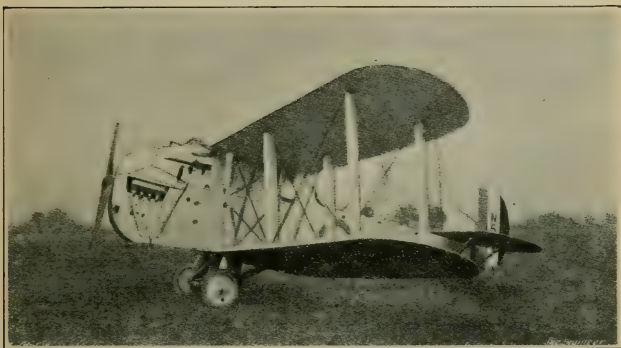
The feat was accomplished in a regulation army airplane with the propeller previously wedged to prevent its operation. In addition to its motor, gasoline, and oil supplies, the machine carried an extra weight of 500 lb. It was in no way modified for gliding.—*Aviation*, 15 January, 1923.

THE JAPANESE AIR APPROPRIATIONS.—The news item from a French contemporary that the Japanese budget for the present fiscal year includes an appropriation for military and naval aeronautics of approximately \$21,000,000 is highly significant. The fact that this appropriation is seventy-six per cent of the total appropriation for the United States Army and Navy Services (\$27,661,450.00) for the current fiscal year is important in itself, for it shows that the Empire of the Rising Sun has fully grasped the value of Air Power. What increases the value of this demonstration is that the Japanese naval air appropriation included in this sum is \$16,000,000 as against \$14,800,000 for the United States Navy.

As the naval ratio of Japan is, under the Washington treaty, sixty per cent of the American naval strength, it may be seen that Japan is spend-

ing money on her naval air force far in excess of her allotted ratio of naval strength, aiming in that service evidently at parity with that of the American Navy. This is a development which should be watched with sustained interest.—*Aviation*, 15 January, 1923.

BLACKBURN DECK-LANDING NAVAL SPOTTING MACHINE (BRITISH).—The Blackburn Aeroplane and Motor Company, Limited, of Leeds, continued during the year to devote its attention principally to naval aeroplanes of the torpedo-plane type. The firm's *Swift* type of torpedo-plane, which we illustrated in our *Annual Review* two years ago, has been supplied to all the principal foreign Governments as well as to our own Air Ministry. The firm's latest development in this direction is a large type of coastal defense torpedo-plane and bombing machine, now being built for the British Government. The machine is intended to carry and discharge a 21-in. torpedo or bombs weighing 1,800 lb. Its long sea range will permit



BLACKBURN DECK-LANDING NAVAL SPOTTING MACHINE (BRITISH)

it to work from a coastal basis. The machine will be driven by a Napier "Cub" 1,000 horsepower engine, and is claimed to be the first aeroplane specially designed from the beginning to employ that motor.

Another interesting naval machine of the Blackburn Company's production is the deck-landing reconnaissance and spotting machine of which a photograph is reproduced herewith. This machine carries a crew of four—a pilot, observer, wireless operator and gunner, and is driven by a 450 horsepower Napier "Lion" engine. The machine is designed in such a way that many of its principal elements are interchangeable with those of the firm's *Swift* torpedo-plane—also a deck-landing machine—so that the spare parts carried on board the mother ship may be reduced in variety. The interchangeable units comprise the engine and its mounting, the radiator and piping, the reserve water tank, oil tank, propeller, main planes and ailerons, tail plane and elevators, fin and rudder, tail skid and wheels. The machine is designed to take off after a run of 100 ft. on the deck of a ship moving at 20 knots. Should it be necessary to alight on the water, provision is made for dropping the landing wheels. Internal air bags are arranged to keep the machine afloat for a considerable period and slings are provided for hoisting in on board the mother ship. The pilot

sits slightly in front of the leading edge of the top plane, while the observer is stationed just aft of the trailing edge, and is sheltered from the wind—so that he may be the better able to use his field glasses, range finder or camera—by carrying the cowling over his head. The gunner's cockpit is in rear of the observer, while the wireless operator is housed between the pilot and the observer. The pilot can bring an additional gun to bear by firing it through the propeller. The wing spars and the longerons are of spruce, but elsewhere the structure is mainly in steel. The machine is designed to have a top speed of 99 knots, a landing speed of 40 knots, and a ceiling of 16,800 ft.—*The Engineer*, 5 January, 1922.

HELICOPTER MAKES FLIGHT WITH TWO MEN ON BOARD.—For what is said to be the first time in history, a two-man helicopter flight was made early at McCook Air Field.

The De Bothezat helicopter, invented and built at McCook Field, was the machine used in the tests, which came a little more than a month after the first successful flight, December 18, when only one man was aboard.

In the machine on the two-man flight were Major T. H. Bane, former McCook Field commandant, and Art Smith, veteran civilian aviator, now attached to McCook Field.

The helicopter ascended about three feet from the ground, rising vertically. It descended without trouble, and the flight was repeated several times with both men aboard.

The tests today are said to mark an important step in the development of the successful De Bothezat helicopter.—*The Baltimore Sun*, 20 January, 1923.

ORDNANCE

TO MODERNIZE OUR BATTLESHIPS.—In order to take immediate steps to prevent our naval strength from falling behind that of other navies or dropping below the ratio established in the arms conference last year, President Harding has submitted a supplemental estimate for a special appropriation of \$6,500,000 to begin the work of modernizing our battleships. The entire program involves the necessary rejuvenation of thirteen capital ships, the total cost of which will amount to \$30,000,000, according to the director of the budget, whose approval was given to the estimate. Eventually this expenditure will amount to \$60,000,000, in the opinion of the naval officers who are familiar with the situation.

Foremost among the work of modernizing our fleet is the increase in the range of the guns. The startling declaration has recently been published that all but five of our super-dreadnaughts are out-ranged more than 5,000 yards by practically the entire British fleet of capital ships, rendering our vessels virtually obsolete.

Other features of the program involve the conversion of six of the battleships from coal to oil burners, the protection of the decks from aerial attack by the addition of armor, and the increase in the defensive measures against mines and torpedoes. This latter feature includes the process of adding tanks or compartments to the sides of the ships to afford protection against torpedo attack from other surface vessels and from submarines. This type of construction became known as "blisters" during the war because of the warty effect the compartments lend to the dreadnaughts; they add to the fuel capacity of the oil burners, as well as give protection to the vitals of the ships from the torpedoes and mines.—*Army and Navy Register*, 9 January, 1923.

UNITED STATES FLEET BATTLE PRACTICE.—From the responses received to Secretary Denby's invitation to Congressmen to witness the maneuver of the United States in March, there will be a distinguished party. The maneuvers will come after the adjournment of Congress and will give an opportunity to the members of the Naval Affairs Committee to witness the firing upon the old battleship *Iowa*.

It is planned to get as much out of the test with the radio controlled *Iowa* as possible. In all probability the *Iowa* will be sunk in the closing phase of the test, when a fire of 14-in. guns from the *Mississippi* will be directed against it.

Using the *Iowa* as a moving target five problems will be worked out against her. The first test will be with secondary batteries of 5-in. guns, which will try out the present fire control system with a rapid change of range. The *Iowa* will be run at varying speeds while under fire and the observers can thus ascertain whether the fire control system is effective under these conditions.

The second test will be for 14-in. turret guns, in which the two ships will change their courses frequently as commanders would in a duel between two battleships.

Turret guns will be employed in the third practice. The test here will be to determine whether accuracy of fire from turrets turning from the right to left can be obtained when the enemy turns to the right or left at frequent intervals.

The fourth test will be night attack. Searchlights, star shells and other modern systems of illumination will be employed, and 5-in. rifles will be used.

In the fifth exercise 14-in. guns will be used in indirect fire upon the *Iowa*. In clear weather the range will be 25,000 yards, but in hazy weather or with a smoke screen the range will be reduced to 15,000 yards. In this maneuver aircraft will be used for observation and spotting.—*Army and Navy Journal*, 6 January, 1923.

NAVY IS EXPERIMENTING WITH PEPPERMINT OIL.—Every ship of the United States Navy afloat and every naval training station have been supplied with a certain quantity of peppermint oil by the Bureau of Ordnance for use in gas warfare training.

The idea of supplying the oil is to acquaint the personnel with the properties and use of the gas mask. When the instructions issued on the use of the oil are followed out, the oil can be detected by its odor when not wearing a gas mask, but is absorbed by the chemicals in the gas mask, so that, when wearing a gas mask, the personnel cannot detect the presence of the vapor of the oil. Similarly, it can be used to test the proper fit of the gas mask in that if a man wearing a gas mask perceives the odor of the oil there is certainly a leak in the mask.—*Boston Evening Transcript*, 5 January, 1923.

RADIO AND NAVIGATION

RADIO BEARINGS.—The Hydrographic Office has printed on the back of North Atlantic and Central American Waters Pilot Charts for January and the North Pacific and Indian Ocean Pilot Charts for February a Radio Bearing Conversion Diagram developed by Commander F. C. Martin, U. S. Navy, of the Hydrographic Office. This diagram will also be issued as H. O. Chart No. 5193.

The purpose of this diagram is to easily convert the radio or true bearing which is received by the vessel into a mercator bearing so that it may be laid down by the navigator in the ordinary way, thus allowing him to dispense with tedious interpolations from tables or computation to

obtain this correction. The diagram gives at once without any other special facilities just what is needed, hence making any available mercator chart good for plotting of radio bearings. This renders the application of this valuable aid to navigation within the reach of all mariners regardless of whether or not they carry a specially constructed set of radio compass charts.

SONIC SURVEY. WEST COAST.—The U. S. S. *Hull* and *Corry* completed, on December 22, a sonic survey of the West Coast of the United States, from Point Descanso, Mexico, to San Francisco. Lines of soundings were run at five-mile intervals from the hundred fathom curve to the floor of the Pacific, from Point Descanso to Point Conception. From Point Conception to San Francisco, the lines of soundings were at ten-mile intervals. In all 6,800 miles of soundings were taken and it is reported that several uncharted banks were discovered.

The sounding operations were conducted upon request of the Carnegie Institute of Washington to be used in connection with the Institute's study of the cause of earthquakes.

NEW NAVAL AIRCRAFT INSTRUMENTS.—The annual report of the Naval Observatory contains the following reference to new developments of aeronautical, navigational, and aerological instruments:

Two new types of aero compasses were tested in March. The Briggs-Heyl earth inductance compass was tried out in a *DH 4* plane at Anacostia and was later given a thorough test at the Naval Observatory shop and compass house. The Sperry gyro compass was tried out in an *F5L* plane and later tested at the naval air station at Anacostia. Unfortunately neither one of these compasses is yet properly developed for use in heavier-than-air machines. The Sperry gyro compass could be satisfactorily used in large airships of the *ZR* type.

The aerial sextant as designed by Lieutenant Commander Byrd is considered the best artificial horizon sextant that has been tried out. Five Navy Standard sextants fitted with Fischer artificial horizon attachment have just been received from Keuffel and Esser Company, and it is believed that these instruments will be an improvement.

The British low-reading altimeter as manufactured by Short and Mason, of London, has proved successful and is the best low-reading altimeter that we now have for issue. A temperature-compensated high-reading altimeter was developed by the Bureau of Standards. Further experiments are necessary.

Altitude azimuth instruments for observing pilot balloons have been delivered to the Observatory from three sources: Keuffel and Esser Company, E. S. Ritchie and Sons, and the Washington Navy Yard. These three types of instruments are different, though intended for the same purpose. They are being tested by the aircraft tender Wright.

Pilot balloons, 6 and 9-in. and 7½-in., as manufactured by the United States and Faultless Rubber Company, respectively, have passed excellent tests and are now being issued to the service.

A plotting board designed by Keuffel and Esser Company for plotting the positions of these pilot balloons in their ascensions is being tested at Anacostia.

A luminous-ground wind indicator, manufactured by the Air Transport Equipment Company, of Long Island, is being tested at Anacostia. This indicator is in use at McCook Field and at Hazelhurst Field.

The air stations and the U. S. S. *Wright*, *Aroostook*, and *Langley* have been fitted out with complete sets of aerological instruments. All twenty-four-hr. drum aerological instruments have been changed to seven-day ones.

A chapter on aerial navigation for the new book on navigation that is to be used by midshipmen was compiled by the officer in charge of the aeronautic desk at the Naval Observatory.—*Aviation*, 8 January, 1923.

WIRELESS LIGHTHOUSE DEEMED SUPERIOR TO RADIO BEACONS.—A wireless lighthouse has been installed on Inchkeith designed for use in fog. By means of reflectors wireless waves are concentrated into a beam with a radiation of about 100 miles, which revolves and in passing each point of the compass assumes a distinctive signal. The installation will be of service only to vessels equipped with wireless. For ships possessing direction-finding instruments it will be a simple matter to determine precisely their position, while other craft with wireless sets will be able to deduce their whereabouts approximately.

An apparatus twenty feet high is employed and with the reflector the diffusion of the waves is prevented. The broadcasting wave is 360 metres and it is held that the shorter the wave-length the freer it is from interference. The wireless lighthouse is considered an advance on the American system of establishing radio beacons on the Atlantic seaboard by the aid of which vessels with directional apparatus can work out their position in a fog.—*The Nautical Gazette*, 23 December, 1922.

MISCELLANEOUS

GREAT BRITAIN AND THE NAVAL TREATY.—According to an American press dispatch imputed to the Navy Department, "the scrapping hitherto done in Great Britain has affected only vessels formerly classified as wholly obsolete." This called forth a rejoinder from the British Embassy, which said that the dispatch could hardly have come from official sources "because what is stated is contrary to facts officially known to the Washington Government."

What are the facts? Up to the present date all but one of the nineteen British dreadnaughts doomed by the treaty have been stricken off the list. Nine of them have been actually broken up or are now undergoing that process; the remaining nine have been stripped of all essential fighting gear—the turrets being removed in some cases—and will be sold for demolition as soon as purchasers can be found for them. The sole survivor of the nineteen is the *Lion*, the order to dismantle her having been suspended a few weeks back for reasons not yet officially disclosed.

Now, if the eighteen discarded ships were compared with the *Maryland* or the Japanese *Negato*, they certainly might be termed obsolete, but measured against such vessels as the *Michigan*, *Delaware* or the Japanese *Settsu*—none of which have yet been scrapped—they would still rank as thoroughly effective. In fact, several of them are considerably more powerful than the dreadnaughts that will remain in the American and Japanese fleets after treaty-scrapping operations are concluded. To elucidate this point further I have prepared the following short table showing the characteristics of certain British ships already scrapped and of dreadnaughts reserved for future duty in the United States Navy.

Some British Dreadnaughts Already Discarded

- 3 *Orions*—Completed 1912, 22,500 tons, 21 knots, 10 13.5-in. guns.
- 1 *Erin*—Completed 1914, 23,000 tons, 21 knots, 10 13.5-in. guns.
- 1 *Agincourt*—Completed 1914, 27,500 tons, 22 knots, 14 12-in. guns.
- 1 *Princess Royal*—Completed 1912, 26,350 tons, 28 knots, 8 13.5-in. guns.

Some United States Dreadnaughts to Be Retained in Post-Treaty Fleet.

- Utah, Florida*—Completed 1911, 21,825 tons, 21 knots, 10 12-in. guns.
- Arkansas, Wyoming*—Completed 1912, 26,000 tons 20½ knots, 12 12-in. guns.

We therefore arrive at the cardinal fact that Britain has practically disposed of all the ships she is pledged to give up under the treaty, although that instrument is not yet operative, and that among them were half a dozen of later design and consequently greater war value than certain ships which the United States and Japan will retain in their post-treaty fleets. As this is well known to the Washington Navy Department, the British Embassy had good reason to doubt whether the department had inspired the misleading press dispatch alluded to above.

When explaining to Parliament last week the steps that have been already taken to scrap warships under the treaty, an Admiralty spokesman said that the British Government had desired to show its intention of giving a lead in the direction of naval disarmament by carrying out the spirit and letter of the treaty.

That such a desire has animated British statesmen is true enough, but candor compels the admission that motives of a slightly less exalted nature have contributed to the premature sacrifice of so many valuable ships. During 1920, when the increasing scarcity of funds made it imperative to cut down naval expenses, the Admiralty placed eleven of the earlier dreadnaughts on the "disposal list," which meant they were to be stripped and sold as opportunity offered. This was done, not because the ships were obsolete, but simply because there was no money to maintain them. These eleven vessels would therefore have been scrapped, treaty or no treaty.

On the other hand, the eight additional dreadnaughts condemned by the treaty would unquestionably have remained on the active list for years to come, seeing that they were individually more modern and powerful than several of the first-line ships to be retained by the United States and Japan. The circumstances that seven of the eight have already been dismantled is probably due as much to financial reasons as to any wish to give the other powers a lead in disarmament.

Let us, as Dr. Johnson enjoined, clear our minds of cant. But, having done so, let us recognize facts as such. Great Britain has anticipated her treaty obligations. The United States and Japan, on the other hand, prefer to wait until the agreement is ratified, and no doubt they are wise to do so. British opinion recognizes the attitude of both powers as being perfectly correct and no sane person here blames them for hesitating to scrap good ships before there is a concrete guarantee of reciprocal action.—*Baltimore Sun*, 22 December, 1922.

FRANCE AND THE NAVAL TREATY.—Last year, in a remarkable study of the super-dreadnaught, the English Admiral Sir Reginald Bacon wrote: "We must consider that Continental Europe, from a naval point of view, is exhausted. The triple alliance has faded away; France and Italy cannot build any large number of ships due to financial reasons; Russia is no longer a world power. Also, the theater of naval operations is removed from the North Sea, the English Channel and the Mediterranean, and is transferred to the Atlantic and Pacific."

One might believe that this theory will rest correct for quite a time. France has not as yet received any reparations, and Italy is under a financial strain. These two nations—which have no aggressive ideas—something which Sir Bacon might well have noted—are certainly not in a measure to construct a Navy as the English Admiral remarked. But, thanks to the errors which have been committed in the Orient, Russia has already commenced to play an important rôle in the equality of naval power.

Even this morning, while the conference at Lausanne was discussing the future of the straits, the Russian delegates made their appearance at

the conference. They did not appear as allies nor as a vanquished power. True, Russia has not as yet commenced to build up her Navy, still the ships which she does not even yet possess, seem to already worry the British Admiralty. At Lausanne, in reply to the Russian expositions of this morning, England will, no doubt, ask that her Navy be permitted to pass the straits and enter the Black Sea. At Bucarest, it is represented to our friends the Roumanians that the English Fleet will be their protector against Russia. In the Straits England has massed a strong naval force, which the London *Times* gives its formidable composition as follows: three battleships at Constantinople; one battleship near Prinkipo; two battleships at Echanak; and one other battleship near Gallipoli, without counting seven light cruisers, thirty-three destroyers, two aviation carriers, six submarines, etc. thirty-one units, of which two battleships belong to the Atlantic Fleet, without mentioning the battle cruiser *Hood* which has been ordered to Gibraltar. Thus—England strips the Atlantic to concentrate her ships at the entrance to the Black Sea. How then can we pretend that Russia is not a Naval power. Since the defeat of the Greeks has made England decide to mobilize her ships we again hear, from the other side of the channel, with more insistence than ever, the voice reclaiming the putting into force the Washington Agreement.

Last Wednesday replying to a question in the House of Commons, M. Eyres-Monsell explained that England has already commenced to comply with the Treaty, and that eight of her capital ships have been sold to be broken up, and six others have been rendered useless for future use. On December 1 the Paris edition of the New York *Herald* published a telegram on this subject. We found therein a list of the ships to which Mr. Eyres-Monsell had reference. The eight battleships sold to be broken up were: *Commonwealth*, *Dreadnaught*, *Saint Vincent*, *Inflexible*, *Hercules*, *Indomitable* and the *Temeraire*. One is tempted to believe that these ships have been recently demolished, when the fact of the matter is—that they did not figure in the list of the British Fleet dated February 1, 1922. In America it was intimated that England simply got rid of the ships that were of no further use as fighting craft. In England, as will be seen from the London *Times* of Friday, they strongly protested against this accusation. On the other hand, if the United States destroy the ships which the Washington Conference calls for they will only destroy old ships. But that is not the real question at issue.

The Treaty of Washington stipulates also the ceasing of work on certain ships under construction. If we look at the British list of February 1, 1922, we see that the stopping of ship construction is not equally divided. England has not at present any ships under construction. Japan must destroy two battleships now under construction except she can transform them into aviation carriers. The United States must cease building the seven battleships now underway (the six of the *South Dakota* class, 43,200 tons and four battle cruisers 43,500 tons). We then see—that the grand affair at Washington did not only concern itself with the demolition of ships, but also with the stopping of construction on ships now in the stocks. In case the construction of ships had continued, England would have had to make a strenuous effort in order that she would not have been out-done by the United States.

Is the United States really disposed to apply the treaty of Washington? The Administration, at least, has no intention of changing its policy. The Washington Conference has been a coup diplomatic for Mr. Hughes, and we know too well the character of this statesman to think that he will disavow his work. Even the recent election results will not change his mind. Certainly the United States has the right to state that the Treaty is not executable since it has not been ratified by all parties. On November 14, in the House of Representatives, the Com-

mittee examined the budget for the Navy for 1923-24. Giving an account of this meeting, where the proposals put forth by the Administration were not seriously objected to, the *New York Herald* writes as follows: The program of construction will continue, and the question of demolition will be suspended, until such time as all parties ratify the treaty of Washington.

In London they are very desirous that France ratify the Treaty. Italy can hardly refuse to do so. As the other three powers have already declared their intention to sign the Treaty, the Treaty would then soon become operative, in which case the United States would not be able to continue the construction of battleships.

But now comes a new side of the affair of which we have spoken previously. Russia has appeared again as a Naval Power, and England is so fully aware of this fact that she has massed her Navy in the Straits. Is it wise to ratify the Treaty and put it in vigor—when there is no limit placed on the Russian armaments? These armaments, which are almost inevitable if the question of the Straits is decided against Russia, do they not risk being the cause of the pretext for abrogating the Washington agreement?

The situation is embarrassing and, for our part, we only see two possible solutions.

To ratify the treaty with reserves—the reserves depending on the consequences, either direct or indirect, which will be produced by the building of the Russian Navy. That would amount to the Washington Treaty not binding the European nations.

Or, recognize that all limitation is in vain if Russia is not taken into consideration, and try and negotiate separately a broader agreement with Russia.

The second of these solutions is perhaps the most laborious. But it is certainly the most loyal and that is why we would prefer it.—*Le Temps*, 5 December, 1922.

ADOPT PACIFIC TREATY IN FRENCH COMMITTEE.—Paris, January 17 (Associated Press).—The commission on foreign affairs of the Chamber of Deputies today adopted the report submitted by Deputy Raynaldy to the sub-commission yesterday in favor of ratification of the Washington Conference agreement concerning the Pacific.

The commission decided to recommend the same reservations as those made by the American Senate concerning military intervention.

The report of Deputy Guernier on the Washington naval agreement will come before the commission in a fortnight.—*New York Times*, 18 January, 1923.

ITALY EXPECTED TO RATIFY WASHINGTON TREATY SOON.—It is reported from a confidential and reliable source that it is the intention of the Italian government soon to ratify the Washington agreements relative to naval disarmament, the Pacific and Far Eastern questions.

Some delay has been caused through disagreement with the Chinese government over the matter of disposal of certain Austrian Lloyd ships that were interned in Chinese ports during the war and since have been seized by the Chinese authorities. It is the Italian point of view that the Versailles Conference decided to pool all former enemy ships thus seized by the allied or associated powers and to redistribute this tonnage among the victorious powers in proportion to the merchant tonnage lost during the war. China suffered no such losses, and hence is not entitled to any vessels, according to Italian official opinion.

Notwithstanding this unsettled question, it now is the intention of the Italian government to ratify all of the Washington agreements, including those relative to China.—*Army and Navy Journal*, 30 December, 1922.

THREE-POWER PACT FAVORED BY JAPAN.—Tokio, December 25.—If France and Italy fail to ratify the Washington Naval Treaty, an agreement for carrying it out might be arranged among England, America and Japan, the peers were told today by Admiral Ide, speaking in place of Premier Kato, who was indisposed.

Admiral Ide explained that such an agreement would be made easier by the fact that Japan already was proceeding with preparations for the naval reorganization. He added that as long as America did not alter her program for auxiliary ships Japan would pursue her revised scheme announced last summer, maintaining a ship ratio of six to America's ten.

Questioned as to whether there was danger that the Japanese Navy would be overbalanced by the American Navy, the Admiral replied that Japan's Navy was superior in the speed of ships and the accommodations of dockyards.—*Baltimore Sun*, 26 December, 1922.

BRITISH SKEPTICAL ABOUT FURTHER LIMITATION.—London, December 21.—Much interest has been aroused in British naval circles by the news that the House of Representatives has adopted the Navy Committee's request that President Harding shall invite the five powers affected by the original limitation treaty to negotiate a fresh compact for the restriction of auxiliary combatant tonnage. It is doubted, however, whether the moment is opportune for such a step, however desirable it may be.

The feverish energy with which Japan is adding to her navy fast cruisers and big submarines—two types specially adapted to offensive warfare and commerce raiding—has not escaped notice on this side of the Atlantic, and it is well understood that the United States has reason to be perturbed by this hectic activity in the dockyards of the Far East. It was fully expected here that a large appropriation for new construction would be submitted to Congress this month, and there was consequently some surprise at Mr. Secretary Denby's recent statement that no new ships would be asked for at the present juncture. The delay is ascribed to political and financial reasons. But failing an immediate program of cruisers and submarines, the relative position of power which the treaty assigns to the United States will be hopelessly lost, and her navy rendered incapable of fighting a successful war in the Pacific, or in any other ocean for that matter.

In these circumstances a new treaty to make good the shortcomings of the original pact is no doubt a very attractive idea, but whether it can be realized is far from certain. Every effort was made during the first conference to bring auxiliary tonnage under the same restrictions as were imposed upon capital ships, but without avail. France firmly refused to accept the ratio of submarine tonnage allotted to her and stood out for a considerably higher figure. This made it impossible to restrict the number of destroyers, which are *par excellence* the antidote to the submarine. Then the British delegates pointed out that the development of ocean-going *U*-boats with heavy armament had also brought light cruisers into the category of anti-submarine craft, besides which these vessels were the natural protectors of the destroyer, and it would therefore be impracticable to limit either cruisers or destroyers if no check were placed on the expansion of submarine tonnage.

Japan, on her side, was opposed to restricting auxiliary ships, which Admiral Baron Kato declared to be essentially defensive. But thanks to France's refusal to accept the submarine ratio, the Japanese delegates were relieved of the invidious task of demanding a free hand in regard to auxiliary tonnage, though it is known they were prepared to do so had it been necessary. Even the American naval representatives are under-

stood to have been against restrictions on auxiliary tonnage without a corresponding check on underwater craft.

Such was the position a year ago and nothing has occurred in the interval to modify the attitude which the powers respectively took upon that occasion. On the contrary, France is more convinced than ever that her naval future lies with the submarine. Since the conference she has begun or ordered twenty-four *U*-boats, which are stated to be only the first installment of her future submersible fleet. It is therefore in the last degree improbable that she would now agree to limit the dimensions of this fleet, even if she were offered a much higher ratio than it was proposed to grant her at Washington. And so long as France remains free to build as many submarines as she pleases, Great Britain could not with safety bind herself down to a fixed ratio of anti-submarine craft, which, in the opinion of her experts, comprise both cruisers and destroyers.

As regards Italy, that power has made it clear that she will enter into no naval commitments which do not equally affect France. It is for this reason that Rome has delayed ratification of the original treaty, and now that a strong Nationalist Government has come into office, there is less prospect than ever that Italy will agree to compromise her maritime position *vis-à-vis* France.

It will be seen, therefore, that the existing situation in Europe is decidedly unfavorable to an early extension of the naval disarmament scheme. Nor is it likely that Japan would welcome such a proposal, since she justifies her present big program of auxiliary construction on two grounds, military and economic. With a battle fleet of only ten capital ships it is essential, she argues, that she be adequately provided with other means of defense, such as cruisers and submarines, and the program now in course of execution is declared to be the absolute minimum consistent with national safety. Yet this program will eventually give her twice as much auxiliary tonnage as she would have possessed if Mr. Hughes' scheme had been adopted.

The economic reason for the program is the necessity of saving from ruin the shipbuilding and allied trades, which form so important a part of the Japanese industrial system, and any proposal to cut down the number of auxiliary warships now building or ordered would be fiercely resisted by the business community as a whole, whose influence on national policy is second only to that of the militarist party. Moreover, the Government fears, or affects to fear, the social unrest that would be provoked were the naval shipbuilding yards and armament factories to lose the work they now have in hand, and thus be compelled to discharge many thousands of their men. It has been estimated that 80,000 families in Japan are directly dependent for their livelihood on the industries in question.

If the foregoing summary of prevailing conditions is correct, there is scarcely any hope of negotiating a new treaty of naval limitations within the near future. And since the Washington Cabinet is obviously in touch with the actualities of the world situation, it is considered most improbable that President Harding will act upon the invitation transmitted to him by Congress. No government cares to expose itself to a serious diplomatic rebuff, yet that risk would undoubtedly be incurred by any government which proposed at this time to summon a conference for the restriction of minor sea armaments.

Naval opinion here is faithfully, if somewhat bluntly, interpreted by one of the service journals, which writes as follows: "It is, after all, mainly a question whether the American people are prepared to pay for their own defense. The financial strain entailed by a building program sufficient to equip their fleet with the cruisers and submarines it needs would not be a serious one in proportion to the national wealth. British taxpayers have readily agreed to spend £14,000,000 on two warships which they believe to be essential for security, and their burden is already infinitely heavier than that of the American taxpayer."—Hector C. Bywater in *Baltimore Sun*, 4 January, 1923.

JAPAN OPPOSED TO LIMIT ON SMALLER WARSHIPS.—Tokio, December 18—The Naval Appropriation Committee's proposal at Washington to supplement the naval treaty by another pact limiting auxiliary ships and submarines is not likely to receive the indorsement of Japanese naval officials, who do not expect the proposal will result in any definite action.

The question of limiting other than capital ships when brought up in the Washington Arms Conference met such opposition that officials believe the Powers could not reach an effective agreement now. Japanese officials and the public generally are eager to see final ratification of the Washington pact, and news that France will decide on it in January was hopefully received.

Should France and Italy or either withhold ratification or cause further delay it is safe to say Japan would be willing to join the United States and Great Britain in a three-Power treaty limiting capital ships, as agreed in the Washington Conference. Further than that she is not now inclined to go.—*Boston Evening Transcript*, 18 December, 1922.

TABLE OF COMPARISON OF WARSHIPS—UNITED STATES, GREAT BRITAIN, JAPAN.—The tables given below show the number of modern warships of various classes of the United States, Great Britain and Japan, either completed, building or projected, as shown by the official records of the United States Navy Department for October 1, 1922.

In the table of modern combatant ships completed whose numbers are not affected by treaty, it will be seen that in destroyers the United States is far in the lead, and she also is largely ahead in submarines of the first Line. In fleet submarines, however, Great Britain has six against three for the United States.

In cruisers of the first line of 27 knots Great Britain has four while the United States and Japan have nine. In light cruisers of 27 knots Great Britain also has the advantage, having forty of this class of vessel, while the United States has none and Japan has ten.

Referring to the table of combatant ships building or projected, it will be seen that the United States has no cruisers of 27 knots projected, while Great Britain has two vessels of this class projected and Japan has four.

In light cruisers of 27 knots Japan leads slightly in numbers, having eleven vessels projected, against ten by the United States and two by Great Britain. The tonnage of the ten United States ships, however, exceeds that of Japan by 8,480 tons.

In submarines under this head the United States enjoys a big advantage, having thirty-five building or projected, against twenty-one by Japan, and six by Great Britain. In fleet submarines, however, Japan is far in the lead, having twenty-five fleet submarines building or projected, against three by the United States and two by Great Britain. Japan is also in the lead in destroyers, building or projected, having thirty-nine under this head, while Great Britain has only five, and while the United States had authority to build twelve, this authority was suspended.

The aircraft carriers are all limited by treaty, and the table as to this type of craft shows that the United States and Great Britain each have 135,000 tonnage completed and Japan has 81,000 tons.

Data Regarding Modern Combatant Ships Whose Numbers Are Not Affected by the Treaty—Completed

Type	United States		British Empire		Japan	
	No.	Tons	No.	Tons	No.	Tons
Cruisers, first line (8,000 tons plus, 27 kts. plus) . .	0	.....	4	56,700	0	.....
Light cruisers, first line (3,000 tons plus, 27 kts. plus)	0	.....	40	*161,690	10	51,210
Flotilla leaders (1,500 tons plus)	0	.....	16	27,810	0	.....
Destroyers, first line (800 to 1,500 tons)	281	333,917	185	†210,111	53	54,985
Light mine layers	14	16,674	0	.....	0	.....
Submarines, first line (500 to 1,000 tons)	59	37,142	36	29,157	28	24,374
Fleet submarines (1,000 tons plus, 20 kts. plus) . .	3	3,318	6	11,280	0	.....
Mine layers submarines	0	.....	7	5,546	0	.....
Monitors, first line (14" plus, 6,000 tons plus) . .	0	.....	3	22,670	0	.....
Monitor submarines	0	.....	3	4,800	0	.....

* Includes four cruisers of 3,500 that are for disposal, but still on Royal Navy list.

† Includes six destroyers of total 5,908 tons that are for disposal, but still on Royal Navy list.

Data Regarding Modern Combatant Ships Whose Numbers Are Not Affected by the Treaty—Building or Projected—No Treaty Limit on Numbers That Can be Built

Type	United States		British Empire		Japan	
	No.	Tons	No.	Tons	No.	Tons
Cruisers, first line (8,000 tons plus, 27 kts. plus) . .	0	.....	2	19,500	4	40,000
Light cruisers, first line (3,000 tons plus, 27 kts. plus)	10	75,000	2	15,100	11	66,520
Flotilla leaders (1,500 tons plus)	0	.....	2	3,500	1	?
Destroyers, first line (800 to 1,500 tons)	See	note*	5	6,125	39	49,975
Mine-layers, first line	0	.....	1	?	1	?
Submarines, first line (500 to 1,000 tons)	35	29,553	6	5,550	21	13,340
Fleet submarines (1,000 tons plus)	3	†6,375	2	3,880	25	32,665

* Twelve boats authorized, but not built, and authority to construct suspended.

† Six boats authorized, but construction held in abeyance.

Aircraft Carriers—Are Limited by Treaty—Completed—Aircraft Carriers (All Experimental and Can be Replaced)

Type	United States		British Empire		Japan	
	No.	Tons	No.	Tons	No.	Tons
Aircraft carriers, first line	0	.....	1	19,100	0	.....
Aircraft carriers, second line	1	12,700	3	24,600	1	9,500
Total	1	12,700	4	43,700	1	9,500
Tonnage allowed under treaty . . . . .	.....	135,000	.....	135,000	.....	81,000

Building—Aircraft Carriers

Type	United States		British Empire		Japan	
	No.	Tons	No.	Tons	No.	Tons
Aircraft carriers, first line	See	note †	0	.....	See	note §
Aircraft carriers, second line	0	.....	2	†38,850	2	|| 19,500

† United States may convert two ships building required to be scrapped into plane carriers, not to exceed 33,000 tons each.

§ Japan same. Not yet definitely known whether *Amagi* and *Akagi* will be converted, or two new ships of 27,000 tons' displacement will be built.

* Experimental; can be replaced.

|| Old 8-8 program called for two aircraft carriers, besides *Hosho*. One is building. Not known whether other will be built.—*Army and Navy Journal*, 30 December, 1922.

RESULTS OF THE CONFERENCE.—On December 30, 1922, the Secretary of State addressed the Annual Meeting of the American Historical Association on the subject: "Some Aspects of our Foreign Policy." The following paragraphs cover about one-fifth of the entire address:

Policy of the Naval Treaty.—The policy of limiting armaments by international agreement has widespread approval. There is no doubt that it has the support of a preponderant sentiment in this country. It seems to be the only way to avoid either a self-imposed sacrifice of security by independent limitation or a competition involving most wasteful expenditures and provocative of war. If you wish peace, you must pursue the paths of peace. Reasonable precaution in a prudent preparation for contingencies is one thing; a bellicose disposition and threatening gestures and preparation are quite different. Competition has its dangers for those who live under constitutional government where the purse strings may be closely held. Those who constantly insist that we should go our own way, scorning the agreements of peace, using our great resources to establish a superiority in armament which would brook no resistance, need a word of caution. It is very important not to wake up the wrong man. At the last it may turn out that you have stirred up fears and corresponding activities elsewhere while your own people refuse to respond to your stimulus. While power and resources may be abundant, the power may not be exercised and you may lose the race which your bravado has encouraged. To a peace-loving democracy what could be more agreeable than reasonable security under an agreement which halts a wasteful competition in armament?

The question really comes, not to the advisability of such an agreement in the abstract, but to the fairness of a particular agreement. One indication that the present Naval Treaty is fair to all may perhaps be found in the fact that in each of the three countries, the United States, Great Britain, and Japan, there were loud complaints that the treaty was to the advantage of the others. As all could not be right, it may be proper to assume that what the naval authorities of these countries in attendance at the Conference approved, was relatively fair. The definitions with respect to standards of measurement and displacement are the same for all Powers. No unfair advantage is given to anyone.

There was general agreement that capital ship tonnage should be used as the measurement of strength of the respective navies. Of course there would be differences of view as to any matter of this sort, but this was the opinion of our experts and of others. With this as a basis for the agreement, we took the existing strength of the different navies as they were. What could be fairer than that? If one Power could better its position, so could another, and the race would inevitably continue. We insisted, and this was entirely reasonable, that vessels under construction should be counted simply to the extent of the work done at the date of the Conference.

The Conference put a stop to competition in capital ships—the great fighting ships of the rival navies. It put an end to the existing competitive programs in capital ships. It established the ratio based on existing strength and took the measure of that strength as shown by the proportion of capital ships built and in course of construction. Based on that standard of measurement, and taking into consideration the factor of age, the Treaty provides for scrapping which will reduce the present capital ship tonnage of the United States to 500,650 tons; of the British Empire to 580,450 tons and of Japan to 301,320 tons, the ships to be retained being named in the Treaty.

On the completion of the two ships of the *West Virginia* class and the scrapping of the *North Dakota* and the *Delaware*, in accordance with the

Treaty, the total capital ship tonnage to be retained by the United States will be 525,850 tons. On the completion of the two new ships to be constructed by the British Empire and the scrapping at that time of four of the older ships, as provided in the Treaty, the total capital ship tonnage retained by the British Empire will be 558,950 tons.

The replacement tonnage of the capital ships of the United States, British Empire and Japan is fixed in the ratio of 5:5:3, and the total capital ship replacement tonnage of the five Powers is to be as follows: For the United States, 525,000 tons; for the British Empire, 525,000 tons; for France, 175,000 tons; for Italy, 175,000 tons; for Japan, 315,000 tons.

Fortifications. Failing to find unfairness in these provisions of the Treaty, there has been some criticism of the agreement to maintain the *status quo* with respect to fortifications and naval bases in the Pacific Ocean. The United States, British Empire and Japan agree to maintain this *status quo* in their respective territories and possessions specified as follows:

"(1) The insular possessions which the United States now holds or may hereafter acquire in the Pacific Ocean, except (a) those adjacent to the coast of the United States, Alaska and the Panama Canal Zone, not including the Aleutian Islands, and (b) the Hawaiian Islands;

"(2) Hongkong and the insular possessions which the British Empire now holds or may hereafter acquire in the Pacific Ocean, east of the meridian of 110 degrees east longitude, except (a) those adjacent to the coast of Canada, (b) the Commonwealth of Australia and its Territories, and (c) New Zealand;

"(3) The following insular territories and possessions of Japan in the Pacific Ocean, to wit; the Kurile Islands, the Bonin Islands, Amami-Oshima, the Loochoo Islands, Formosa and the Pescadores, and any insular territories or possessions in the Pacific Ocean which Japan may hereafter acquire."

With respect to the United States this means that we cannot increase our fortifications and naval bases in the Philippines, Guam and the Aleutian Islands. We are free to add to our fortifications and naval bases in the Hawaiian Islands, and in the islands adjacent to the coast of the United States, Alaska and the Panama Canal Zone, except the Aleutian Islands.

It is hardly necessary to say that every naval strategist has looked at Guam as an island of great strategic value. In fact, its position presents such opportunities that commensurate fortifications and naval facilities, however peaceful might be our actual intent, could hardly fail to be regarded as a menacing gesture of no slight consequence.

But while naval facts are important, political facts are just as important. The strategist will accomplish nothing without his Congress. The political consequences of the action he desires cannot be ignored. We have heard so much from naval experts about Guam that I must refer to what Senator Lodge said about this island during the debate in the Senate on the Naval Treaty. He said that he had been "a good deal amused at the agony of apprehension which some persons have expressed in regard to Guam." We had taken that island in the Spanish-American War; it was taken by the cruiser *Charleston*. But we had had so little interest in the island that we had never passed any legislation to provide for its government. It had been left in the hands of the navy which captured it. The captain of the ship represented the captors and ruled the island. The Senator added that we had never fortified it and nobody would vote spending money in fortifying it.

Was it not better that at a time of considerable tension, instead of threatening Japan by a proposal to fortify Guam, we should agree that for fifteen years we should rest content with the situation with which we

had been satisfied for the past twenty-three years? And it should be remembered that in the same treaty Japan undertakes to maintain the *status quo* in the Kurile Islands, the Bonin Islands, Amami-Oshima, the Loochoo Islands, Formosa and the Pescadores, and any other insular possessions she may hereafter acquire.

My conclusion is that the Naval Treaty will stand the test of analysis and fair statement taking all the pertinent facts into consideration; and that it will be a desirable safeguard and not a menace to our security and at the same time an important assurance of peace. These happy results will be attained, however, on the condition that we act toward other nations in the same spirit of reasonableness and friendship that we expect them to exhibit toward us.

Auxiliary vessels—*Light Cruisers, et cetera.* The original American proposal contemplated a limitation of auxiliary combatant craft in a ratio similar to that recognized by the treaty as to capital ships. It was proposed that the tonnage of auxiliary surface combatant craft including light cruisers, flotilla leaders and destroyers should be as follows: for the United States 450,000 tons; for the British Empire 450,000 tons; for Japan 270,000 tons. Unfortunately this limitation was not secured. I shall not review the reasons for this, but I may say that the failure is not attributable to us. The American position is just the same as it was at the Conference and we should welcome the opportunity to make the agreement upon this subject that we then proposed. So far as I am able to see the difficulties that then stood in the way of such an agreement between the Powers signatory to the treaty still stand.

It should be noted, however, that while the Naval Treaty does not limit the total tonnage, or the tonnage of particular classes, of auxiliary combatant craft, it does limit the size and armament of individual vessels of this sort. The Treaty effectively limits capital ship tonnage, and a capital ship, in the case of ships hereafter built, is defined as a vessel of war, other than an aircraft carrier, with a displacement of more than 10,000 tons or which carries a gun exceeding a caliber of eight inches. The tonnage of aircraft carriers is limited. The Treaty provides that no vessels of war exceeding 10,000 tons (except capital ships and aircraft carriers as stipulated under the Treaty) may be constructed by, for, or within the jurisdiction of, any of the contracting Powers. This is a substantial limitation.

As to light cruisers, the United States is not as well supplied as it should be, but the Treaty does not interfere with adequate provision by the United States to supply this want and it should be supplied. This may be done on a basis which I have no doubt all Powers would recognize as reasonable and without starting an injurious competition. Moreover, at the worst, it should be remembered that competition in combatant craft of not more than 10,000 tons with 8-in. guns is a very different thing than unlimited competition in the monster battleships of over 30,000 tons and which in the case of projected Hoods were running to nearly 50,000 tons.

While the three great Naval Powers are not under an agreement as to limitation upon the total tonnage of auxiliary combatant craft, it ought to be possible to arrange a *modus vivendi* which would preclude a wasteful and unnecessary competition. While plans are now being made by other Powers for new construction of auxiliary combatant craft, there is nothing that can be called in any degree alarming. The point of difficulty, so far as the United States is concerned, is that there is not a proper balance in its navy because of the lack of light cruisers, but as I have said this could properly be remedied.

NAVAL CONSTRUCTION IN 1922.—So far as Europe and the United States were concerned, the past year was one of almost complete stagnation in the

sphere of naval shipbuilding. Only one capital ship was actually laid down, and no new program of heavy construction was adopted. This inactivity was due in part to the economic embarrassments bequeathed by the war, and in part to the Limitation Treaty negotiated at Washington. As a direct consequence of the latter, four capital ships of the largest dimensions, which would now have been on the stocks in this country, were cancelled in November, 1921, and building operations on thirteen similar vessels for the United States Navy were suspended at or about the same date. France, having definitely discarded the battleships she was building at the outbreak of war, made a start last year with her modest program of light construction, which is limited to three cruisers, twenty-four destroyers, and twelve submarines. Italy is at work on a few small craft, but her cruiser program foreshadowed in 1921 has not yet matured. With the exception of Spain, none of the secondary Powers is paying much attention to naval development, and to most of them the present building costs, even for the smallest types of craft, are prohibitive. Only in Japan were the shipyards busily employed throughout the year on naval construction. There the effects of the Washington Treaty, which put a stop to the capital ship program, were partly mitigated by the Government's decision to press on with the building of ships outside the scope of the agreement, and that has been done to such purpose that the aggregate of fighting tonnage now under construction in Japan greatly exceeds the total for Europe and America combined.

Great Britain

The outstanding event of the year was, of course, the allocation during the second week in December of the contracts for the two capital ships, each of 35,000 tons, which Great Britain is empowered to build under the Limitation Treaty. One is to be built by Armstrong, Whitworth and Company, Limited, at their Walker yard on the Tyne, the engines and boilers being manufactured by the Wallsend Slipway Company, Limited; and the other by Cammell Laird and Company, Limited, on the Mersey, the propelling machinery in this case being supplied by the builders. Preliminary work was begun immediately after the contracts had been awarded, and the keel of the Cammell Laird ship was laid at Birkenhead on December 29. Further particulars of the contracts and their effect on the general industrial situation have been given in our columns so recently that they need not be repeated here. Exactly nine years have elapsed since the last battleships were begun for the British Navy, work on the *Royal Sovereign* and the *Royal Oak* having commenced in January, 1914. The *Hood*, a battle cruiser, was laid down in September, 1916, so that no new capital ship has been put in hand for this country for well over six years. From the Armistice of November, 1918, to the present date, only two new keels have been laid for the naval service—a submarine and a mine-laying cruiser. What this almost complete cessation of naval orders has meant to the shipbuilding and allied industries can best be appreciated by recalling the volume of work which they enjoyed during the four years preceding the war, from 1911-14 inclusive. Within that period the following vessels were laid down:

4 battleships, <i>King George V</i> class, each 23,000 tons	.....	92,000 tons
4 battleships, <i>Iron Duke</i> class, each 25,000 tons	.....	100,000 tons
5 battleships, <i>Queen Elizabeth</i> class, each 27,500 tons	.....	137,500 tons
5 battleships, <i>Royal Sovereign</i> class, each 25,750 tons	.....	128,750 tons
1 battle cruiser <i>Queen Mary</i> , 26,500 tons	}	55,000 tons
1 battle cruiser <i>Tiger</i> , 28,500 tons		
6 light cruisers, <i>Town</i> class, each 5,400 tons	.....	32,400 tons
16 light cruisers, <i>Arethusa</i> class, each 3,500 tons	.....	56,000 tons

75 destroyers, each averaging 800 tons	60,000 tons
30 submarines, each averaging 650 tons	19,500 tons

147 vessels	Aggregate displacement	681,150 tons
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In addition to the above, many auxiliary ships were built for the Admiralty, and a considerable number of foreign naval contracts—including four battleships—were booked during the four years in question. These figures justify the assertion that the shipbuilding and naval armament industry has suffered more severely than any other branch of trade by reason of the post-war policy of retrenchment.

The completion of ships begun under the war program has continued to give a limited amount of work to the Royal Dockyards. According to an Admiralty statement in Parliament on December 5, the following vessels were then under construction:

Light cruisers	4
Cruiser mine-layer	1
Flotilla leaders	2
Destroyers	4
Submarines	8
Coastal motor boats	3

Excepting the cruiser mine-layer, one submarine, and the three C. M. Bs, all the above-named vessels were begun during the war. The four light cruisers are: the *Frobisher*, 9,750 tons, laid down at Devonport in August, 1916, and launched in March, 1920; the *Effingham*, a sister ship, commenced at Portsmouth in April, 1917, and launched in June, 1921; the *Enterprise*, 7,600 tons, begun at Clydebank in June, 1918, and launched in December of the following year; and the *Emerald*, a sister ship, laid down by Armstrongs in September, 1918, and launched in May, 1920. As we have previously described these ships, it is only necessary to say that the first two belong to the well-known *Raleigh* class—the nameship of which was wrecked off Labrador last August—which combines high speed, great cruising endurance, and heavy armament; while the second pair were specially designed for fast steaming and are expected to attain 33 knots in light condition. The flotilla leaders are the *Keppel* and *Broke*—formerly *Rooke*—sister boats begun just before the Armistice by Thornycrofts, and subsequently towed to Portsmouth for completion. Their leading particulars are: length, 329 ft.; beam, 32 ft.; draught, 14¾ ft.; displacement, 1,750 tons; speed, 36 knots at 40,000 shaft horsepower; armament, five 4.7-in. guns, one 3-in. anti-aircraft, six torpedo tubes. Of the eight submarines, one is the *K-26*, a steam-driven boat of 1,880 tons, with a designed surface speed of 24 knots; and six belong to the *L* class, 890 tons, 17.5 knots. The eighth boat is *X-1*, laid down at Chatham on November 1, 1921. Her details have not yet been published, but she is understood to be of large dimensions and to embody novel features suggested by war experience. The building operations are being conducted with great secrecy.

The keel plate of the cruiser mine-layer, to be named *Adventure*, was laid at Devonport on November 29. She represents a type new to the British Navy, but her functions are sufficiently indicated by the description. During the war Germany built two small cruisers, *Brummer* and *Bremse*, of very high speed, for the special work of laying mines. The ship building at Devonport appears to be considerably larger than these. Her dimensions are unofficially stated to be:—Length, 500 ft.; beam, 58 ft.; displacement, 7,000 tons; the ratio of breadth to length indicating that a high speed is aimed at. According to a Press report published last month, the design, which is the work of Sir E. H. Tennyson d'Eyncourt, "marks a new departure, so that she may be regarded as an experimental ship; and

although the character of her armament is at present confidential, it is believed that she will be heavily armed for a vessel of this class." As the Navy Estimates for the current fiscal year provide for only £294,990 to be spent upon her, it looks as if slow progress is to be made with the building of the ship, in the earlier stages at least.

The present year is expected to witness the completion of the aircraft carrier *Hermes*, the first ship to be specially designed for the duty designated. Begun by Armstrong in January, 1918, she was launched in September, 1919, and then towed to Devonport for completion. Her length is 594½ ft. over all; beam, 70 ft.; draught, 18¾ ft.; displacement, 10,950 tons. She has geared turbines of 40,000 shaft horsepower for a speed of 25 knots. The armament includes seven 6-in. guns and four 4-in. anti-aircraft. The boiler uptakes are led into a single large elliptical funnel which, together with a light superstructure and a tripod foremast, is placed on the extreme starboard side, thus leaving a large area of deck space clear for machines to take off and alight. The ship has light armor over vital parts, and it is protected against underwater attack by bulges. Another aircraft carrier, the *Eagle*, which although nominally completed in 1920 has since undergone a refit involving partial reconstruction, is also expected to hoist the pennant this year. Laid down as a battleship for the Chilean Government, but taken over by the Admiralty and converted into an aircraft carrier, the *Eagle* is 661 ft. long, 104 ft. in beam, and displaces 22,790 tons. She burns coal and oil, and has a designed speed of 24 knots. Originally equipped with one funnel, she now has two, and these, with the upperworks and tripod mast, are disposed on the starboard side, as in the *Hermes*. The hull has armor and bulge protection. Armament: nine 6-in. guns, six 4-in. anti-aircraft. The number of aeroplanes she will carry when in service has not been disclosed. A third vessel of the same generic type, the *Furious*—designed initially as a fast cruiser to mount two 18-in. guns and afterwards converted into a carrier—has been at Devonport since last June, undergoing a refit, the extensive nature of which is indicated by the large sum, £300,315, set apart in the current Estimates to be spent on her. As the center-line position of her huge funnel tended to cause "air pockets," and the superstructure was inconveniently placed for machines alighting on the deck, it is understood that she will emerge from her refit minus these obstructions and fitted with horizontal ducts for the emission of furnace gases and smoke from the side, as is the case in the *Argus*.

United States

In accordance with the provisions of the Limitation Treaty, work was suspended early last year on the seven battleships and six battle cruisers which are surplus to the tonnage ratio accorded to the United States, and the only capital ships now completing are the *Colorado* and *West Virginia*. These belong to the *Maryland* class, the nameship of which entered service in the autumn of 1921. On October 1, 1922, the latest date for which official figures are available, the *Colorado* was 93.8 and the *West Virginia* 84.1 per cent complete. The money voted for their completion is so limited that they have made very slow progress, and neither ship is sufficiently advanced as yet to be ready for her trials. The probable dates of completion are noted as July and September, 1923, respectively. The ships have been fully described in previous issues of this journal. Displacing 32,600 tons, and equipped with the system of turbo-electric drive, which has been adopted for all recent capital ships of the United States Navy, they incorporate many structural and military features based upon war data. Their armor and sub-surface protection is particularly strong. When commissioned they will form, with the *Maryland*, a squadron of post-Jutland battleships unequalled as a tactical unit, though the Japanese ships *Nagato*

and *Mutsu* are, perhaps, rather more powerful individually. The light cruiser program, voted in 1916 but not actually put in hand till 1918-20, has been greatly delayed by shortage of funds. Early last year work came to a standstill on several of the ten vessels, and so far as is known very little has been done upon them during the past twelve months. The *Omaha*, which was launched in October, 1920, and in January last was so well advanced that her trials were anticipated for the summer, is still unfinished. A few months of active work would suffice to make ready for sea the *Milwaukee*, *Cincinnati*, *Detroit*, *Richmond*, and *Concord*, but at the present rate of progress it is impossible to say when they will be in service.* At the close of the year there remained on the stocks the *Raleigh*, *Trenton*, *Marblehead*, and *Memphis*. The first, laid down at Fore River in August, 1920, was sixty-one and nine-tenths per cent complete in July last; the second, building at Philadelphia, since August, 1920, was fifty-two per cent complete; the *Marblehead*, also begun at Philadelphia at the same time, was thirty-six per cent; and the *Memphis*, which has been in hand at the same yard since October, 1920, only twenty-eight per cent complete. The *Detroit* was launched on June 29 last. All ten ships are built to a standard design of 7,500 tons, and have geared turbines of 90,000 shaft horsepower for a speed of 33.7 knots. If this velocity is attained they will be the swiftest cruisers in the world. The design, it will be recalled, was modified late in 1920, the armament being increased from eight 6-in. guns to twelve, this involving an increase in displacement and a corresponding reduction in speed. They will be the first American ships of war to be fitted with a tripod foremast.

Three destroyers, the *Trever*, *Perry*, and *Decatur*, were delivered last year, leaving no further vessels of this type under construction. The boats named are "flush deckers" of 1,215 tons and 35 knots, and were built at the Mare Island Navy Yard. On July 1, 1922, there were forty submarines still under construction, but about twelve of these have since been delivered. Thirty-seven are of the S class, displacing from 800 to 990 tons, with a surface speed of 15 knots. They are regarded as the most successful type of submarine which has been built in the United States so far. The majority of the class have the following dimensions: length, 231 ft.; beam, 21 ft.; draught, 12½ ft.; displacement, 854 tons on surface, 1,052 tons submerged. Two sets of 600 brake horsepower Diesel engines are fitted, and the fuel supply is sufficient for a run of 5,000 miles at 11 knots speed. They are armed with four 21-in. bow tubes—five in a few boats—and one 3-in. or 4-in. gun. A special feature of this class is the heavy construction and careful subdivision, intended to minimise the effect of depth-charge attack. The remaining three boats, *V1* to *V3*, are "fleet submarines," or submersible cruisers, 335 ft. long and displacing 2,025 tons in surface trim. They are understood to be fitted with two sets of 2,400 brake horsepower engines for a speed of 21 knots. Armament: four bow and two stern tubes, and one 5-in. 51-caliber gun. Their cruising radius is estimated at 12,000 miles. Work has been resumed on the former battle cruisers, *Lexington* and *Saratoga*, which are in process of conversion to aircraft carriers, displacing 33,000 tons each. The machinery, which will remain unchanged, will develop 180,000 horsepower through sixteen boilers and General Electric turbines with electric drive. Authentic details of their armament and capacity for aeroplanes are not yet available. They will be rigged with one large funnel placed on the extreme starboard side, a cage mast, and a light superstructure. Other vessels building, and all much delayed, are: the repair ship *Medusa*, 10,000 tons; the destroyer tenders

* According to latest figures, the completion dates of the ten light cruisers are as follows: *Omaha*, January, 1923; *Milwaukee*, March, 1923; *Cincinnati*, July, 1923; *Raleigh*, "Indefinite"; *Detroit*, February, 1923; *Richmond*, February, 1923; *Concord*, May, 1923; *Trenton*, "Indefinite"; *Marblehead*, "Indefinite"; *Memphis*, "Indefinite."

Dobbin and *Whitney*, each 10,600 tons; and the submarine tender *Holland*, 10,600 tons. As Congress does not appear to have made any further appropriations for speeding up the completion of unfinished ships, it is expected that work on these vessels will continue at the same leisurely pace during the present year. A new program—including sixteen cruisers each of 10,000 tons—which it was proposed to introduce last month, is understood to have been deferred for financial reasons.

Japan

The Washington Treaty having put a stop to all capital ship construction in Japan the shipyards there have been compensated by large orders for cruiser, destroyer, submarines, and auxiliary tonnage. This has been made possible, not by increasing the number of these vessels projected before the Treaty came into force—the original program has, in fact, been curtailed—but by increasing their dimensions and antedating by one year the period in which the program is to be completed. Two light cruisers were launched last year: the *Yura*, at Sasebo, on February 15, and the *Kinu*, at Kobe, on April 29. They are modified versions of the *Kuma* class, displacing about 5,600 tons and designed for a speed of 33 knots. The armament consists of seven 5.5-in. guns. The following light cruisers are on the stocks or about to be laid down: *Ayase*, *Otonase*, *Minase*, *Abukuma*—believed to be sister ships of the *Yura*; the *Yubari*, *Kako*, *Naka*, *Sendai*, *Jintsu*, *Kinugasa*, and *Furutori*—of 7,000 to 7,500 tons; and four ships not yet named, of 10,000 tons, to be armed with 8-in. guns. All Japanese light cruisers completed recently have proved very fast, most of them exceeding their designed speed of 33 knots, and behaving admirably at sea. Twelve or more destroyers are completing afloat, and a further twenty-four, with an average displacement of 1,500 tons, are to be begun at an early date. The present position with regard to submarines is uncertain. It is believed, however, that eighteen or twenty boats are in various stages of construction, and that twenty-four more are soon to be laid down. Among the boats launched last year was *No. 62*, on April 13, with a surface displacement of 1,500 tons. The former battle cruisers *Amagi* and *Akagi*, re-designed as aircraft carriers of 33,000 tons, are building at Yokosuka and Kure respectively, and both are expected to take the water this year.

France

A start was made last year on the new naval program, and the following vessels are now, or shortly will be, under construction:

Three light cruisers: *Duguay-Trouin*, *Lamotte-Piquet*, *Primaguet*; displacement, 8,000 tons; geared turbines and eight oil-fired boilers, 98,000 shaft horsepower=34 knots; radius of action 4,875 miles at 15 knots. Armament: eight 6-in. guns in four turrets on the center-line, two forward and two aft; four 3-in. anti-aircraft guns, and twelve 22-in. torpedo tubes. The *Duguay-Trouin* and *Primaguet* are building at Brest, and the *Lamotte-Piquet* at Lorient.

Six flotilla leaders: *Jaguar*, *Panthère*, *Léopard*, *Lynx*, *Chacal*, *Tigre*. Displacement, 2,500 tons; 48,000 shaft horsepower=35.5 knots; radius of action, 2,600 miles at 18 knots. Armament: six 5.1-in. guns, twin-mounted; two 3-in. anti-aircraft guns, and six 22-in. torpedo tubes. Their large size and powerful armament bring these vessels very near the light cruiser type.

Twelve destroyers: *Bourrasque*, *Cyclône*, *Mistral*, *Orage*, *Ouvrage*, *Sicque*, *Sirocco*, *Tempête*, *Tramontane*, *Tighbe*, *Typhon*, *Tornado*. Displacement: 1,400 tons; 30,000 shaft horsepower=32.5 knots. Armament: four 5.1-in. guns, two 3-in. anti-aircraft, and four 22-in. torpedo tubes.

Six first-class submarines: *Requin*, *Morse*, *Narval*, *Dauphin*, *Marsouin*,

Souffleur. Displacement: 1,100 tons; two 1,400 brake horsepower engines = 16 knots.

Six submarines "de moyenne patrouille": *Sirène*, *Ariane*, *Circé*, *Calypso*, *Naiade*, *Ondine*. Displacement: 600 tons, 14 knots.

The former battleship *Béarn* is undergoing reconstruction as an aircraft carrier. No naval vessels were launched last year.

Italy

The new Italian Government is reported to have proposed the construction of two cruisers, four destroyers, and four submarines, at an estimated cost of 200,000,000 lire. According to Press reports, one cruiser is to be built at the Orlando yard, Leghorn, and the other at the Cantiere San Rocco, Trieste. Naval work during the past year was limited to the completion of the three "scouts," or destroyers, *Leone*, *Pantera*, and *Tigre*, 2,200 tons and 34 knots; six smaller destroyers, *Generale* class, of 813 tons and 33 knots; and a few small gunboats of 230 tons. The project of reconditioning the battleship *Leonardo da Vinci*, which was sunk by an explosion and afterwards salvaged, has been given up.

Minor Navies

There is little of interest to report in connection with the smaller navies. On August 1 there was launched at Horten Arsenal the first submarine boat to be entirely built and engined in Norway. She is of 420 tons and 14.5 knots speed. Another boat, similar in type, is on the stocks. Germany is building at Wilhelmshaven a light cruiser of 5,600 tons, which will probably be launched this year. Holland is completing the two cruisers, *Sumatra* and *Java*, of 7,050 tons and 30 knots, and three small submarines. Spain is building two 4,725-ton cruisers of 29 knots speed; three gunboats of 1,335 tons; and five submarines of 610 tons.—*The Engineer*, 5 January, 1923.

NOTES

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"A New Lifeboat Engine"—(An article in *The Engineer* for March 1st, 1912, covers all motor lifeboat installations from 1904-11. This article describes the new Peulee lifeboat, 45 ft. by 12 ft., speed 8.4 knots, with engine completely enclosed in watertight casing)—*The Engineer*, 22 December, 1922.

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1. "The Lausanne Conference."

2. "Franco-British Split on German Reparations."

3. "Betrayal of Greece by Lloyd George," by Paxton Hibben.

4. "What the British Elections Mean," by Sir Gilbert Parker.

5. "Five Years of the Russian Revolution," by Nikolai Lenin.

6. "The Tide That Swept Italy's Fascisti to Power," by Arnaldo

Cortesi.

7. "Basic Causes of the Present Plight of France," by J. Ellis Barker.

8. "Why Egypt Is in Revolt," by A British Publicist.

9. "Nationalism Marches on in India," by V. B. Metta.

10. "Our Navy Unready for War," by Graser Schornstheimer.

11. "Russia's Departure From State Socialism," by Alexander I. Nazarov.

The Contemporary Review, December, 1922:

1. "The Defeat of President Harding"—(An interesting review of the recent elections from an Englishman's point of view), by S. K. Ratcliffe.

2. "The Tangier Crisis"—(Somewhat along the same lines as Admiral Niblack's "Letter" published in the December, 1922, *PROCEEDINGS*, and of special interest to those who have studied this particular phase of Mediterranean problems) by George A. Matthey.

3. "The Future of the Philippines"—(A discussion as to whether our sovereignty is to be withdrawn, or whether some new form of government is to be ventured upon in place of the present tenuous connection), by Charles Edward Russell.

NOTES ON INTERNATIONAL AFFAIRS

FROM DECEMBER 23 TO JANUARY 23

PREPARED BY

ALLAN WESTCOTT, Professor, U. S. Naval Academy

FRENCH OCCUPATION OF RUHR BASIN

ALLIED DISAGREEMENT.—During the first week in January the British, French and Belgian Premiers and the Italian Foreign Minister held a series of conferences in Paris which ended in the breakdown of united Allied policy toward Germany. There was substantial agreement over the reduction of the reparations total to 50,000,000,000 gold marks, but direct British opposition to the French proposal that any moratorium should be accompanied by seizure of "productive guarantees," including occupation and control of production in the great German coal and industrial region east of the Rhine. Upon support of the French policy by Italy and Belgium, Premier Bonar Law retired from the conference, leaving France at liberty to pursue these measures without British participation. The separation was entirely friendly, with no direct indication that Allied co-operation would be disturbed in other fields. The French and British premiers defined their positions as follows:

M. Poincaré defined the grounds of difference with a question: Was there to be a moratorium with pledges or without pledges? France and, he was happy to add, Belgium and Italy were of the opinion that pledges must be taken. Only the British were opposed, and he asked Mr. Bonar Law to make one more attempt to accept the desire of the majority that the condition of pledges as defined in the French plan should be attached to the moratorium.

Mr. Bonar Law, speaking slowly, answered that under no circumstances could he accept the French proposal that a moratorium should be accomplished by pledges of the kind proposed. Further, he could not accept the distinction which M. Poincaré had made between the British and French points of view. It was not, he said, a question of pledges which was the real difference in principle between the British and French delegations, but whether the steps to be taken would or would not prevent the recovery of German credit.

The British view was that there were two ways of dealing with the question. One was to seize whatever was within reach and the other was to see if what was seized would prevent the recovery of German credit. He therefore put it to the conference that the real grounds of difference was not merely one of particular pledges, but whether the amounts which Germany was to surrender under these pledges during the next two years were not so great as to make the recovery of German credit impossible.

British examination of the French proposals had shown that the amount of £80,000,000 sterling would be collected from Germany and that it did not matter whether that amount was in cash or kind, the result would be

the same—it would completely prevent the recovery of German credit and therefore prevent the collection of those large sums from Germany which the Allies as victors in a war of wanton aggression had a right to expect. That being so, he could not give his adherence to the French proposals, and to his great regret he felt compelled to retire from the conference.

GERMANY DECLARED IN DEFAULT.—On December 26 the Allied Reparation Commission declared Germany in voluntary default in wood deliveries by a vote of 3 to 1, Belgium and Italy supporting France against Great Britain. Germany had carried out something over sixty per cent of the required deliveries for 1922. This action of the Commission forecast the subsequent disagreement in the Conference of Premiers.

On January 9 the Commission by the same vote declared Germany in voluntary default in coal deliveries, the amount supplied being about 2,000,000 tons short of the 13,500,000 due France in 1922. The British delegate, Sir John Bradbury, upheld the right of Germany to make good by supplementary cash payments. The American observer in the Commission, Mr. Boyden, submitted a statement admitting the technical legality of the action taken, but asserting the impossibility of the Versailles treaty terms and questioning the practical efficacy of the measures proposed.

MILITARY OCCUPATION OF THE RUHR.—Following the action of the Reparation Commission, France and Belgium sent identic notes to Germany declaring their decision to send engineers and a mission of control to supervise deliveries in the Ruhr coal region, with troops sufficient to safeguard the mission and insure the execution of the measures to be undertaken. French forces occupied Essen on January 11. When the German coal owners under orders from Berlin held up coal deliveries, the zone of occupation was extended before January 15 to include practically all the mines of the Ruhr region and control of all exits by water or rail, so as to insure full revenues from the tax on exports of coal. About 45,000 troops were used in the operation. Owners of coal mines who refused to submit to French control were put under arrest.

GERMAN COUNTERMEASURES.—The German ambassadors on January 10 quitted Paris and Brussels. The German Government sent a protest to all neutral nations declaring that the action taken by France and Belgium was in violation of the Versailles Treaty on the following grounds:

"1. Germany's defaults in her deliveries of wood and coal would, according to the note of the Reparation Commission of March 21, 1922, always only justify demands for subsequent payments.

"2. The Treaty of Versailles does not admit any territorial sanctions.

"3. The measures allowed by the Treaty of Versailles against Germany can only be applied by the Allied Powers as a whole and not by single powers of their own accord.

"The German Government herewith enters a protest against the oppression applied toward Germany in contradiction to the treaty and international law. The German Government does not intend to meet violence with

violence nor to reply to the breach of the treaty with a withdrawal of the treaty. However, as long as the state of affairs contrary to the treaty exists, Germany is not in a position to make actual reparations to those powers who have brought about this state of affairs."

Germany at once notified the Reparation Commission of her intention to suspend payments of money or in kind.

Upon the occupation of Essen the German Coal Syndicate transferred its papers and headquarters from Essen to Hamburg. This great syndicate by its control of coal deliveries exercised a predominant influence over all German industrial production and it was held largely responsible in France for the various devices by which Germany had evaded the requirements of the Versailles Treaty. The change of headquarters was made in order that France should be forced to undertake direct control and operation of the mines.

AMERICAN PROPOSAL DISREGARDED.—In the United States Senate, Senator Borah offered an amendment to the Naval Appropriation Bill proposing that the President should call a world economic conference. This amendment was subsequently withdrawn upon assurances that the Government had already offered suggestions of this nature to European powers. On December 29 Secretary Hughes in a speech at New Haven stated that the United States had approached the Allied nations with the suggestion that, in case of Allied disagreement over reparations, a commission of financiers from the nations concerned, including the United States, should attempt a solution. It appeared, however, that this was only a suggestion, and was not favorably received abroad; nor did the American objections to occupation of the Ruhr, which were informally presented at the same time, serve to deter the action taken.

AMERICAN TROOPS WITHDRAWN.—By a vote of 57 to 6 the United States Senate on January 6 adopted the Reed resolution stating that it was "the sense of the Senate" that American troops should be immediately withdrawn from the Rhine. Orders for the withdrawal were issued by the President on January 10, with provision that the 1,200 troops should embark about January 24 from Antwerp.

LAUSANNE CONFERENCE ON NEAR EAST

FINAL ACTION DELAYED.—The difficulties of the Allies over German reparations delayed negotiations at Lausanne and, while not outwardly dividing the Allies in their Turkish policy, led the Turkish delegates to adopt a stiffer attitude. The chief opposition arose over the disposition of the Mosul oil fields, the allotment of the Turkish debt, and jurisdiction over foreigners in Turkey.

Lord Curzon on December 27 declared definitely that Great Britain would not allow the Mosul villayet to be separated from Iraq. Ambassador Child for the United States spoke for favorable treatment of

Armenians, and on January 15 stated that the American Government expected most favored nation treatment in all Turkish fiscal arrangements affecting foreigners, and also equality of treatment with Turkish citizens in everything affecting commerce, education, charity, and religion.

Agreement was reached for exchange of populations involving the removal of about 600,000 Greeks from Turkey (the 200,000 in Constantinople excepted) and 450,000 Turks from Greece and Western Macedonia, these exchanges to be carried out whether or not a general treaty agreement was reached. It was expected that a draft of the treaty would be presented to Turkey before the end of January.

RUSSIA AND NORTHERN EUROPE

LITHUANIANS SEIZE MEMEL.—During January Allied control of the town and district of Memel, at the mouth of the Niemen River between German East Prussia and Lithuania, was seriously threatened by attacks of Lithuanian irregular forces. Since the war both the town and outlying districts have had a German local government under supervision of a French commissioner with a garrison of French troops.

On January 15 Lithuanian irregulars to the number of 2,000 or more entered the city, forced a truce with the French garrison of about 200, and remained in occupation. Their primary grievance was against the German local government and the difficulties of German currency, although their aim was apparently also to force a disposal of the territory in favor of Lithuania.

French destroyers and other Allied war vessels were despatched to the scene, and on January 17 it was announced that the Allies would send a special commission to Memel to reestablish a provisional government under Allied authority.

Washington, January 20.—The Lithuanian Legation here is in receipt of official advices from its home Government that diplomatic relations have been broken off by Germany as a protest against the seizure of Memel by Lithuanian irregular forces. The German Government, it is said, has broken off negotiations for the conclusion of a commercial treaty, and has instructed its newly appointed Minister to Lithuania not to present his credentials.

The text of the communication received by the Legation from Kovno follows:

"The German Foreign Office has submitted a vigorous note to the Lithuanian Minister at Berlin protesting against the insurrection at Memel and its seizure by rebel forces under Vilius Gaigalaitas.

"The note broke off negotiations for an economic treaty between Germany and Lithuania, which had reached an advanced stage, and notified Lithuania that the newly appointed Minister to Lithuania, S. Olsehausen, just arrived in Koyno, has been instructed not to present his credentials.—*New York Times*, Jan. 21.

GREAT BRITAIN

BRITISH DEBT COMMISSION RETURNS TO ENGLAND.—The British Debt Commission, headed by Chancellor of the Exchequer Stanley Baldwin,

which came to America in January, held its first conference with the United States Commission on January 8, and continued conferences during the following week. The British delegation gave assurance of Great Britain's purpose to assume the full burden of the debt, and gave figures to show that the British budget had been balanced during the last three years, but that this had been accomplished by a tax rate amounting to about \$100 per capita. These figures were presented to show England's need of a low interest rate and suspension of payments on the principal for a considerable period. The British delegates proposed an interest rate of three and one-half per cent, whereas the American delegation indicated that no rate lower than four per cent or four and one-fourth per cent was likely to be approved by Congress.

The British delegation returned on January 20 with the arrangement that further negotiations should be conducted through the British Embassy.



REVIEW OF BOOKS

A REVIEW BY REAR ADMIRAL N. C. TWINING, U. S. NAVY

Q—SHIPS AND THEIR STORY. By E. Keble Chatterton, late Lieutenant Commander, R. N. V. R. Sidgwick and Jackson, Ltd., London, 1922.

By the early winter of 1914 the surface control of the sea was practically assured to the Allies, the destruction of Von Spee's squadron by Sturdee having cleared the outer seas of all enemy ships except the *Konigsberg*, blockaded in an African river. Beneath the surface, however, the case was different for the German submarines had already begun their effective work; the three *Cressy's* had been sunk on September 22, the British steamers *Glitra*, *Malachite*, and *Primo* in October and November, while two more British cruisers, *Hermes* and *Niger*, succumbed to submarine attack before the middle of November.

Germany now began to realize, if she had not done so before, what a weapon of offense she had in her hands and doubtless dreamed of gaining the control of the sea, the retention of which was so important to the Allies. The latter, on the other hand, were not slow to grasp the situation and to inaugurate means for fighting the submarine and for neutralizing the menace to their lines of communication.

Among the devices earliest resorted to in the anti-submarine warfare was the use of decoy ships which, to all external appearance were peaceful fishermen or trading vessels, but were actually armed for offensive action. The principle involved was, of course, not new, but in the matter of detail the decoy ships of 1914-18 were necessarily adapted to the existing conditions of the sea war and it is in respect of these details that the *Q*-ship is unique in history and was, in its equipment and handling, the incarnation of the ingenuity, courage, dash, determination and patience of the personnel, both regular and volunteer, of the British Navy with whom the idea originated and by whom, chiefly, it was carried into execution.

The book under review is a narrative of engrossing interest covering the activities of the British *Q*-ships from the date of the commissioning of the *S. S. Vittoria*, November 29, 1914, to the night, nearly four years later, when the *Privet* sank *U-34* in the Mediterranean, the last submarine to be destroyed before the Armistice. The arrangement is, in general, chronological, enabling the reader to form a very clear idea of the gradual evolution of the *Q*-ship, the modifications made from time to

time as experience in this peculiar kind of warfare taught its lessons, and the rapid increase in skill at the game that resulted from practice.

Vessels used as decoys ranged in type from large, ocean-going steamers to 34-foot open boats and included both steam and sailing vessels, cross-Channel steamers, colliers, cargo tramps, converted sloops, topsail schooners, barquentines, smacks, and trawlers. Of each class of vessel so employed, if we except the cross-Channel steamers and the open boats (cobbles), some one or more achieved a measure of success but it is the "three island" tramp steamer that, on the whole, must be regarded as having proved most suitable for the service.

The preparation and fitting out of vessels for *Q*-ship service was an art that was perfected by experience. Vessels were selected and assigned to certain areas of operation with a view to complete deception of the enemy; that is, they must not only present the appearance of trading vessels but of such vessels as were usually to be found in those areas. The utmost care was exercised in the matter of disguise; guns were carefully concealed in false deckhouses, in boats, or behind bridge screens in such a way that, while close inspection from without would arouse no suspicion, the concealing structure could be instantaneously dropped giving the guns free arcs of fire. Care of details became increasingly important as time went on and the submarine commanders became more and more wary. The converted sloop *Tulip* was sunk by submarine *U-62* whose captain reported that, while she was a very well-disguised trap, his suspicion of her character was aroused by the way the merchant flag was hoisted and by the fact that she appeared to have no defensive gun such as was carried by practically all merchant vessels at that period. In a similar vessel, the *Viola*, an imitation cargo hatch and derrick had been installed but these were vertically over the overboard (above water) discharge, a fact that was noted by the captain of a submarine and disclosed the character of the vessel.

The officers and crew were, of course, always dressed in plain clothes such as would naturally be worn by the personnel of the simulated vessel. This artifice was carried even further at times by dressing some of the officers as pilots, passengers, or women.

Machine guns were carried by nearly all vessels while the main armaments ranged from 1-pounders to 4-inch. One of the earliest *Q*-ships, the *Prince Charles*, carried a 3-pounder and a 6-pounder; the *Pargust*, fitted out in March, 1917, was armed with one 4-inch gun, four 12-pounders, and two 14-inch torpedo tubes. The 12-pounder was the largest gun carried by the earlier ships but the 4-inch was added or substituted after the discovery of the amazing ability of the submarine to stand punishment and when the submarines, themselves, were armed with guns out-ranging the 12-pounder.

In order that the ships might remain afloat as long as possible if torpedoed or badly damaged by gunfire, their holds were, in many cases, filled with empty casks or timber. This device served in a number of instances to permit of prolonging an engagement and even of saving the

vessel. In the *Suffolk Coast*, the last *Q*-ship to be fitted out, and which the author describes as "a veritable box of tricks," special water-tight bulkheads were fitted to reduce her vulnerability to torpedoes.

Secrecy as to the character of a ship was promoted by changing her name as soon as she sailed from her fitting out port. Thus the *Arvonian*, which was manned by the United States Navy and commanded by Commander D. C. Hanrahan, was fitted out at Devonport under that name but, on sailing for Queenstown, her name was changed to *Santee*. As the *Santee*, it may be remarked in passing, she had a short but honorable career, being torpedoed a few hours after sailing from Queenstown for Bantry Bay on December 27, 1917. Captain Hanrahan had not the satisfaction of engaging his assailant who departed for other scenes of activity without showing himself.

Not only were names changed to further the deception of the enemy as to the identity of vessels but their whole external appearance was frequently altered by the use of dummy escape pipes on funnels, changing funnel markings, repainting the entire vessel, changing arrangement of spars and rigging, altering appearance of deck structures by the use of canvas screens, and otherwise. Such transformations were frequently effected at sea, usually after an unsuccessful engagement with a submarine; their effectiveness is made evident by an inspection of some of the illustrations in Mr. Chatterton's book.

The personnel of the *Q*-ships included regularly commissioned officers and enlisted men of the Royal Navy, the Reserve, Volunteer Reserve, and Fleet Reserve as well as officers and men of the merchant service. The vessels were always commissioned as His Majesty's ships and commanded by duly commissioned officers so as to establish their public status in international law.

The sphere of operations of the *Q*-ships extended from the Arctic Ocean to the west coast of Africa and from the North Sea, English Channel, and Mediterranean to the western Atlantic. On December 8, 1916, the *S. S. Intaba* (*Q 2*) engaged a submarine in Kola Inlet; at about the same time the *Barranca* (*Q 3*), of 4,115 tons, was working off Madeira and the Canaries, while the *Dunclutha* and *Ooma*, of 3,000 to 4,000 tons, operated between the northeast coast of South America and the northwest coast of Africa.

It was in home waters, however, the North Sea, English Channel, and off the Irish and Scottish coasts, that the bulk of the work of the *Q*-ships was done, more of them being based on Queenstown than on any other one port. To those officers of the United States Navy who had the privilege of knowing Admiral Sir Lewis Bayly the following extract from Mr. Chatterton's book will seem a just appreciation:

"One of the greatest enthusiasts of the *Q*-ship idea was Vice Admiral Sir Lewis Bayly, who was in command of the Irish coast. No *Q*-ship officer serving under this admiral could ever complain that anything was left undone by assistance that could have been performed by the sagacity or advice of this commander-in-chief. . . . With his vast knowl-

edge of human nature, and his glance which penetrated into a man's very soul, he could size up the right type of volunteer for decoy work; then having selected him and sent him to sea, he assisted him all the time whenever wireless was advisable, and on their return to port encouraged, advised and rested the captains. . . . No keen, capable officer on this station who did his job ever failed to get his reward; and the result of all this, and the certain knowledge that if *in extremis* a Queenstown naval ship would at once be sent to his rescue, created such a fine spirit that an officer would almost sooner die than return to port after making a blunder of an engagement."

The *Q*-ships always operated singly; although it was not unusual for two or more to be in the same vicinity at one time, no concerted action was taken in true *Q*-ship work. Methods necessarily differed in detail according to circumstances but one idea was fundamental to all methods and plans of action: viz., to get as close to the enemy as possible or to lure him as close as possible before throwing off disguise, hoisting the White Ensign, and opening fire. (It is, perhaps, needless to say that merchant colors were shown so long as disguise was maintained). When accompanying convoys it was customary for the *Q*-ship to lag behind like a "lame duck" thus not only inviting attack but luring the submarine away from the convoy.

"It seemed for the professional naval officer as if the whole of his previous life and training had been capsized. Instead of his smart, fast destroyer, he found himself in command of an awkward, disreputable-looking tramp, too slow almost to get out of her own way. On the other hand, officers of the Mercantile Marine, fresh from handling freighters or liners, in whom throughout all their lives had been instilled the maxim "safety first," now found they had to court risks, look for trouble, and pretend they were not men-of-war. *Q*-ship work was, in fact, typical of the great upheaval which had affected the whole world."

The business of the *Q*-ship was to invite attack which might be by gunfire or by torpedo. A submarine having attacked, a portion of the crew, the "panic party," was sent away in boats while the remainder, including the guns' crews, lying concealed, awaited the approach of the submarine which usually came up to ascertain the name of the ship, to question the people in the boats, or to take prisoners and to complete the sinking of the vessel. Frequently the submarine was excessively cautious and would motor submerged round and round the damaged ship inspecting her through the periscopes. In one recorded case (the *Action*) the submarine came so close as actually to collide with the *Q*-ship, "shaking the latter fore and aft." Meanwhile the concealed *Q*-ship captain, watching the enemy through some sort of a peep-hole, patiently awaited the moment when the submarine, apparently satisfied of the harmlessness of his victim, came to the surface at short range and in a position in which the *Q*-ship's guns would bear; he then gave the order for action, screens were dropped, and fire opened.

In some cases the submarine, through caution or suspicion of the character of his quarry, could not be induced to close and the *Q*-ship was obliged to engage at ranges of 3,500 yards or more. In others the engage-

ment was fought at very short ranges, 300 yards to point blank; in such cases the accuracy of fire was of a high order and it was seldom that the enemy escaped; if he did manage to get away it was in a condition of such serious damage that he was obliged to return to base for extensive repairs.

It was usual for the *Q*-ships to avoid torpedo hits if possible by altering the helm or otherwise; the potential damage from such hits was so great that the ship might be prevented from carrying out her further mission. In contrast to this customary practice Captain Gordon Campbell's orders were, "Should the Officer of the Watch see a torpedo coming, he is to increase or decrease speed as necessary to ensure it hitting!" This order was carried into effect when the *Farnborough* engaged a submarine on February 17, 1917; the torpedo struck the ship abreast No. 3 hold. The *Farnborough*, although badly damaged, did not sink but was towed into Bantry Bay and beached. Her antagonist in this engagement, *U-83*, was destroyed.

The author gives some interesting statistics on the number of *Q*-ships employed and the results of their activities. In October, 1916, forty-seven *Q*-ships were operating at one time comprising types from motor drifters to medium-sized steamers. During the whole period of the war a total of 180 *Q*-ships were employed and to them the author credits more than eighty cases of "damaged German submarines . . . sent home licking their wounds, anxious only to be let alone for awhile." The author further states that, of 203 enemy submarines sunk during the war from various causes, eleven were destroyed by *Q*-ships. Actually, the text gives accounts of the sinking of ten *U*'s, five *UB*'s, and two *UC*'s, a total of seventeen. Of these eleven were accounted for by steamers, two by fishing smacks, two by submarines towed by trawlers, one by a trawler, and one by a sailing ship.

It is an interesting co-incidence that the text cites also seventeen cases of loss of *Q*-ships; two of these, the *Vala* and *Begonia*, never returned from their last cruise. The former was reported by German wireless to have been sunk by a submarine; of the *Begonia*'s fate nothing is known. The *Prize (Q-21)*, commanded by Lieutenant Commander Sanders, torpedoed by *UB-48* at midnight, February 11, 1918, sank with all hands.

The *Candytuft* engaged a submarine in the Mediterranean, off Cape Sigli, on November 18, 1917; a torpedo struck her in the starboard quarter entirely blowing off the stern and killing all the officers except the captain and two others, one of whom was badly wounded. A half hour later another torpedo tore off the bow, yet the remaining hulk drifted on the African coast and her guns were ultimately salvaged.

Casualties in engagements were, in general, lighter than might have been expected and, in the cases of total loss of ship and crew, the greater part of the personnel was usually saved. The U. S. destroyer *Wadsworth* rescued three officers and eight men of the *Lady Patricia*, the commanding and engineer officers of which had been taken prisoner by the Germans.

The U. S. S. *Noma* rescued some of the personnel of the *Dunraven* on the occasion of her sinking. The French destroyer *Dunois* picked up the survivors of the *Lady Olive*, sunk in the Channel on February 17, 1917, after they had been in open boats for upwards of thirty-six hours. Twice during the process of rescue the *Dunois* had to break off to attack a submarine which was hanging about in the vicinity having, apparently, followed the boats, perhaps for the purpose of attacking any vessel that might undertake a rescue.

Among the many ships and officers that did remarkable and praiseworthy work in this most hazardous service it may seem invidious to cite names. While we are prone to rate most highly those who achieved conspicuous success in the actual destruction of submarines, in simple justice we cannot overlook those less successful who gave the best of their skill and intelligence to the work and missed the supreme reward through bad luck or adverse circumstance. The author selects as the three *Q*-ships "which had the longest and most exciting career—*Penshurst*, *Farnborough*, and *Baralong*." Of these the *Farnborough* and *Baralong* were in service for more than three years and survived the war, each having several engagements with submarines and each sinking two. Of the *Penshurst* the author records nine engagements of which two resulted in the destruction of the enemy; she was, herself, sunk on Christmas Eve, 1917. The *Privet* is the only other vessel credited with two sinkings.

Undoubtedly the best known to the American reader of the *Q*-ship captains is Gordon Campbell, who commanded successively the *Farnborough*, *Pargust*, and *Dunraven*, destroyed three submarines, was promoted, first to Commander, then to Captain, and was further rewarded by the bestowal of the Victoria Cross, the Distinguished Service Order, and two bars to the latter. His last encounter with a submarine was while in command of the *Dunraven*; although the *Dunraven* was sunk and the *U*-boat escaped, the engagement was classic; the story of it, plainly but forcibly told by Mr. Chatterton, is thrilling and from it stand forth in high relief all the qualities of officers and men that spelled success in *Q*-ship warfare. The skill, patience, and indomitable spirit of captain, the courage, discipline, and devotion to duty of officers and men, were never more conspicuous than in this five-hour fight with a cautious and expert enemy.

Another notable *Q*-ship captain was Commander F. H. Grenfell, R. N., a retired officer who came back to active service at the outbreak of the war. In command of the *Penshurst* he fought several submarines and was successful in two engagements, sinking *UB-19* and *UB-37*, and receiving the D. S. O. as a reward.

Lieutenant W. E. L. Sanders, R. N. R., was "a gallant New Zealander who had come across the ocean to help the Motherland, performed amazing service in *Q*-ships, fought like a gentleman, won the Victoria Cross, and eventually, with his ship and all his crew, went to the bottom like the true hero that he was." After some subordinate service he was, in Febru-

ary, 1917, given command of the sailing ship *Prize* (Q-21) in which vessel he fought a long and spirited engagement with U-93 for which he received the Victoria Cross and was promoted to Lieutenant Commander. His antagonist was so terribly damaged that it seemed impossible that she could have escaped destruction. The boats of the *Prize* picked up the submarine's captain, Von Spiegel, and two others who were believed to be the only survivors; yet U-93 was successfully taken home by Sub-Lieutenant Ziegler, a fine achievement for which he was promoted by the Kaiser. For an engagement with a submarine on June 12, 1917, Sanders received the D. S. O., but he lost his ship and his life at the hands of UB-48 in August of the same year.

Mr. Chatterton has produced a most readable historical narrative of the activities of the mystery ships and one which bears every evidence of historical accuracy although the historical style is not followed and an occasional reference to the enemy as "the Hun," while not out of place, perhaps, in a book of this character, would not be suitable in a severe history.

The author's sources of information are authentic, he having acquired much information from Q-ship officers, from official reports, logs, private diaries, plans, sketches, and so on as well as from personal observation while serving in patrol vessels off the southwest Irish coast. In addition to drawing from these British sources—the author has carefully examined such German reports as have been made available; while these are, as yet, far from complete as to the submarine activities such information as may come to light hereafter can hardly change essentially the view of the facts as presented in this book.

Mr. Chatterton takes pains to deny certain wild stories, current at the time, of atrocities charged against the Germans on the occasion of the sinking of the *Prize* and makes an authentic statement of the facts; in another place he testifies to the unexceptionable conduct of Von Spiegel when rescued from U-93 who, when taken on board the *Prize*, offered his word of honor to make no attempt to escape and undertook that he and his men should render all possible assistance, the *Prize* being in desperate case herself as a result of the encounter.

On the other hand, the author cites an apparently authentic case of a submarine intentionally firing on the boats containing the "panic party" of a Q-ship, the *Dunraven*.

The book has an excellent Index in which the names of ninety-three Q-ships are found and by means of which the fortunes of each ship can be followed through the pages of the book. Altogether, Mr. Chatterton has made a very notable and acceptable contribution to the naval literature of the Great War and has produced a book not only well worth reading but of value as a book of reference.

A Review by Rear Admiral H. S. Knapp, U. S. Navy

WHY WARS COME, by Rear Admiral A. P. Niblack, U. S. Navy. 12mo. 165 pages, \$1.50. (The Stratford Company, Boston.)

This recent book by a well-known officer should attract the interest of naval officers because it was in large part written especially for them. Admiral Niblack describes it as the outgrowth of a lecture at the Naval War College on "Forms of Government in Relation to their Efficiency in War," and of a second lecture given before the Grotius Society on "Foreign Policies in Relation to the Causes of War."

About one hundred pages are devoted to a discussion of forms of government. With the birth of constitutional government as a starting point, Admiral Niblack discusses briefly the tendencies toward nationalism on the one hand and internationalism on the other, toward federalism, and toward representative government. He then lays down seven criteria by which to analyze forms of government, and applies these criteria to the governments of the more prominent nations. The reader may not always agree with the writer, but that very fact is thought-provoking and distinctly valuable. Of this part of the book the *New York Evening Post* recently said:

"In the main portion of the book he analyzes with keen insight and just discrimination the main character of the various governments in the world today. His thought is so correct and phrased in such direct and accurate language that the lack of an index is unfortunate, for this is a book to which one may often wish to refer for concise and sound judgments or definitions on innumerable problems of government and policy."

Parallel with his discussion of forms of government the author discusses governmental policies. The connection of both with his title is made at the outset, where he says, on page 2:

"Wars result primarily from the conflicting interests or the conflicting policies of states. It is well, therefore, to inquire why national policies necessarily conflict. Imperfectly organized governments have plunged some countries into wars. It is well, therefore, to examine carefully the forms of government. We may express it in these terms. War being possible it is well to consider national policies and forms of government in their relation to war, in the hope of avoiding the causes of war."

In Chapter XIV the author discusses very briefly the effect of the League of Nations in preserving peace. He reaches the personal conviction that "we should try to apply the same rules of morality to states that we do between individuals." In Chapter XV are given some valuable data concerning the area and population of a number of states, in which one notes with regret the absence of these data for the French homeland although they are tabulated for French possessions elsewhere. In the final chapter the author states his conclusions, which the reviewer will leave to the reader to discover for himself.

The book makes no pretense to be an exhaustive treatise on the subjects with which it deals. It does set down in simple and clear language the conclusions born of the author's wide experience, some of which gave him more opportunity than often falls to naval officers to observe the workings of foreign governments at close range. The book has been well received abroad. The well-known naval writer, Mr. Hector C. Bywater, devotes more than two columns to it in a recent issue of the *Naval and Military Record*, in which he says: "The result is a thoughtful and thought-compelling book, which will be welcomed as a really valuable contribution to the literature of political science."

With these words of Mr. Bywater the present reviewer is content to close his own account, except to add that it is a pity that the book should be marred in appearance by a number of typographical errors.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

NAVAL INSTITUTE PRIZE, 1923

The Board of Control, having considered the articles published during the year 1922, has awarded prizes as follows:

Naval Institute Prize, 1923 "for the best original article on any subject pertaining to the naval profession."—Awarded to Rear Admiral W. V. Pratt, U. S. Navy, —*Some Considerations Affecting Naval Polity*, published in the November, 1922 issue—Cash prize of \$200 and a gold medal.

Honorable Mention, 1923 Commander F. M. Perkins, U. S. Navy—*Is the Fleet Strategically Concentrated?* published in the November, 1922 issue—Cash prize of \$75 and a life membership in the Naval Institute.

The Board of Control interprets the rules governing award in such a manner that articles published serially will be considered as eligible for the prize in the year when the last installment is published.

Membership Present Membership, 4,623. Changes since January 1, 1923: New members, 102. Resignations, 21. Deaths, 5. Total Increase, 76.

Members are requested to urge non-members to join, and send subscriptions for the PROCEEDINGS to their friends outside the Service. These may begin with any month desired.

Dues Membership dues (\$3.00) for the year 1923 are payable. Members are urged to remit promptly. Dues continue until the date of receipt of resignation in writing.

**Life
Membership**

investment he ever made.

Attention is called to the advantage of taking out a life membership, the cost of which is only \$40, giving the certainty of never being *in arrears* for dues. One officer writes that it was the best

**Subscription
Rates**

In order to bring the subscription rate more nearly in line with the cost of publication, the Board of Control has increased the subscription rate to \$5.00 per year. A special rate of \$3.50 per year is made to members only (not available to societies or organizations) in order that they may send subscriptions to the PROCEEDINGS to their relatives and friends. (Foreign postage 50 cents extra in all cases). Subscriptions are automatically discontinued at expiration.

Back Issues

Membership and subscriptions may start with any month desired. For a limited time, subscriptions or membership may commence with the December, 1922 issue, in order to have a complete file of the interesting article on "Destroyer Experiences" completed in the current issue.

Discussions

Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at one-half the rate for original articles, or about \$2.25 a page.

Articles

The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication.

**Book
Reviews**

As soon as practicable after the publication of books on subjects of professional interest, the Institute aims to publish authoritative reviews of them.

Book Department *The Institute Book Department will supply any obtainable naval, professional, or scientific book at retail price, postage prepaid.* The trouble saved the purchaser through having one source of supply for all books should be considered. The cost will not be greater and sometimes less than when obtained direct from dealers.

Address orders to: U. S. Naval Institute, Annapolis, Maryland.

Address of Members To insure the delivery of the PROCEEDINGS and other communications from the U. S. Naval Institute, it is essential that members and subscribers *notify the Secretary and Treasurer of every change of address without delay.*

Reprints of Articles Twenty copies of reprints are furnished authors free of charge. Additional copies to the number desired will be furnished at author's expense, provided request is made before going to press.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

BALANCE SHEET
U. S. NAVAL INSTITUTE
DECEMBER 31, 1922

ASSETS

<i>Cash</i>		
Farmers' National Bank.....	\$ 5,837.45	
Savings Banks	17,209.88	\$ 23,047.33
<i>Accounts Receivable</i>		
Dues	\$ 5,382.98	
Subscriptions	11.45	
Advertisements	360.81	
Various Dealers	5,756.47	11,511.71
<i>Other Assets</i>		
Bonds	\$102,352.39	
Inventory	38,556.88	
Prepaid Royalty	245.64	
Furniture and Fixtures	\$ 2,950.66	
Less Depreciation	586.63	2,364.03
Prepaid Expense	989.16	
Authors' Rights	2,151.46	146,659.56
TOTAL ASSETS		<u>\$181,218.60</u>

LIABILITIES AND NET WORTH

<i>Accounts Payable</i>		
Lord Baltimore Press	\$ 564.38	
Various Dealers	1,768.20	
Accrued Royalty	74.13	\$ 2,406.71
<i>Prepayments</i>		
Dues	\$ 765.79	
Subscriptions	988.91	
Sundry	105.23	1,859.93
TOTAL LIABILITIES		\$ 4,266.64
<i>Reserves</i>		
Reserve Fund, Jan. 1, 1922	\$ 8,964.09	
Add: From Cash	79.50	
From Miscellaneous .....	.50	
From Surplus	80.00	\$ 9,124.09
Reserve Bad Debts Jan. 1, 1922.....	\$ 554.51	
Less Charges	4.05	550.46
		<u>\$ 9,674.55</u>

Surplus

January 1, 1922	\$170,177.75	
Add 1921 Bill Cancelled	88.86	
	<u>\$170,266.61</u>	
Less Transferred to Reserve Fund...	80.00	
	<u>\$170,186.61</u>	
Year's Loss	2,909.20	167,277.41
		<u>176,951.96</u>
		<u>\$181,218.60</u>

PROFIT AND LOSS STATEMENT
U. S. NAVAL INSTITUTE

FOR THE YEAR ENDING DECEMBER 31, 1922

Institute Publications

Sales		\$33,206.73
Purchases	\$21,173.63	
Add Inventory, Jan. 1, 1922.....	32,609.62	
	<u>\$53,783.25</u>	
Less Inventory, Jan 1. 1923	36,492.74	
	<u>\$17,290.51</u>	
Add Royalty	4,446.11	21,736.62
Profit		\$11,470.11

Purchased Books

Sales		\$ 3,004.48
Purchases	\$ 2,389.18	
Inventory, Jan. 1, 1922	946.01	
	<u>\$ 3,335.19</u>	
Inventory, Jan. 1, 1923	951.86	2,383.33
		<u>621.15</u>

Profit on Book Sales		\$12,091.26
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Proceedings and Index

Sales		\$ 317.17
Income Dues and Subscriptions.....	\$15,682.11	
Advertisements	3,209.18	
New Subscribers	298.03	
New Members	203.30	
Binding	44.00	19,436.62
	<u>\$19,430.20</u>	
Total Income PROCEEDINGS		\$19,753.79
Purchases	\$18,300.50	
Inventory, Jan. 1, 1922	1,130.70	
	<u>\$19,430.20</u>	
Inventory, Jan. 1, 1923	1,112.28	

	\$18,317.92	
Discount	74.00	
Contributors	4,879.98	
Bad Dues	95.17	
Envelopes	93.00	
Prizes	275.00	23,736.07
Loss on PROCEEDINGS		3,982.28
Trading Profit		\$ 8,109.98
<i>Operating Expense</i>		
Postage	\$ 1,721.25	
Advertisements	943.43	
Office Expense	653.22	
Salaries	12,413.00	
Express and Hauling	275.92	
Board Meetings	1,405.72	
Cost of Collection	6.88	
Depreciation Furniture and Fixtures..	295.07	
Insurance	60.18	
A. B. C. Membership.....	59.80	
Christmas Gratuities	90.00	17,924.47
Operating Loss		\$ 9,815.49
<i>Sundry Income</i>		
Interest Income	\$6,477.29	
Interest Expense	230.28	\$6,247.01
Bond Appreciation	\$ 875.00	
Less Loss Bond		
Sale	\$175.00	
Less Commission...	50.25 225.25	649.75
Income Sundries	9.53	6,906.29
Loss for Year		\$ 2,909.20

CHANGES IN NET WORTH
FOR THE YEAR ENDING DECEMBER 31, 1922
U. S. NAVAL INSTITUTE

ASSETS

	Dec. 31, 1921	Dec. 31, 1922	Increase	Decrease
Cash Farmers' National Bank...	\$ 4,499.71	\$ 5,837.45	\$1,337.74	\$.....
Savings Banks	16,541.74	17,209.88	668.14	.....
Dues Receivable	3,142.18	5,382.98	2,240.80	.....
Subscriptions Receivable	22.10	11.45	.....	10.65
Advertisements Receivable	717.13	360.81	.....	356.32
Accounts Receivable	17,373.94	5,756.47	.....	11,617.47
Bonds	102,587.39	102,352.39	.....	235.00
Inventory of Books	34,686.33	38,556.88	3,870.55	.....
Prepaid Royalty	291.29	245.64	.....	45.65
Furniture and Fixtures	2,915.66	2,950.66	35.00	.....
Prepaid Expense	1,154.36	989.16	.....	165.20

Refunds Receivable	2.70	.....	2.70
Authors' Rights	2,964.41	2,151.46	812.95
Totals		<u>\$8,152.23</u>	<u>\$13,245.94</u>

LIABILITIES

Decrease Increase

Depreciation Furniture and Fixtures	\$ 291.56	\$ 586.63	\$.....	\$ 295.07
Accounts Payable Lord Baltimore Press	4,369.98	564.38	3,805.60	.....
Accounts Payable Miscellaneous	326.55	1,768.20	.....	1,441.65
Royalty Payable	86.48	74.13	12.35	.....
Prepaid Dues	963.40	765.79	197.61	.....
Prepaid Subscriptions	1,076.55	988.91	87.64	.....
Miscellaneous Overpayments ..	88.07	105.23	.....	17.16
Reserve Bad Debts	554.51	550.46	4.05	.....
Reserve Fund	8,964.09	9,124.09	.....	80.00
Totals		<u>\$ 4,107.25</u>	<u>\$ 1,833.88</u>	
		<u>\$12,259.48</u>	<u>\$15,079.82</u>	
1921 Bill Payable Cancelled				88.86
Year's Loss		2,909.20		
		<u>\$15,168.68</u>	<u>\$15,168.68</u>	

Audited and Found Correct:

JOHN DOWNES, *Commander, U. S. Navy.*H. D. COOKE, *Commander, U. S. Navy.*W. R. VAN AUKEN, *Commander U. S. Navy.*

Approved by the Board of Control, February 14, 1923.

H. G. S. WALLACE, *Commander, U. S. Navy,*
Secretary and Treasurer.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE, 1924

A prize of two hundred dollars, with a gold medal and a life membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original article on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the article.

On the following pages are given suggested topics. Articles are not limited to these topics and no additional weight will be given an article in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original articles published in the PROCEEDINGS during 1923 shall be eligible for consideration for the prize.

2. No article received after October 1 will be available for publication in 1923. Articles received subsequent to October 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best article published during 1923 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more articles receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. The method adopted by the Board of Control in selecting the Prize Essay is as follows:

(a) Prior to the January meeting of the Board of Control each member will submit to the Secretary and Treasurer a list of the articles published during the year which, in the opinion of that member, are worthy of consideration for prize. From this a summarized list will be prepared giving titles, names of authors, and a number of original lists on which each article appeared.

(b) At the January meeting of the Board of Control this summary will, by discussion, be narrowed down to a second list of not more than ten articles.

(c) Prior to the February meeting of the Board of Control, each member will submit his choice of five articles from the list of ten. These will be summarized as before.

(d) At the February meeting of the Board of Control this final summary will be considered. The Board will then decide by vote which articles shall finally be considered for prize and shall then proceed to determine the relative order of merit.

6. It is requested that all articles submitted be typewritten and in duplicate; articles submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

H. G. S. WALLACE,

Commander, U. S. Navy, Secretary and Treasurer.

SUGGESTED TOPICS FOR ARTICLES

Aviation—Its Present Status and Probable Influence on Strategy and Tactics.
The Anti-Aircraft Problem from the Navy's Viewpoint.
Co-ordination of the Naval Air Force with Other Naval Forces.
Naval Bases, Their Number, Location, and Equipment.
Military Character.
The Relation of Naval Communication to Naval Strategy.
Proportion of National Budget Which Should be Devoted to Naval Expenditures.
The Necessity for Having a Fleet.
Organization of Fleet for War.
The Offensive and Defensive in Gas Warfare.
The Best Protection from Gas Attack.
Naval Gunnery of Today, the Problems of Long Range and Indirect Fire
Physical Factors in Efficiency.
The Relation between the Navy and the Merchant Marine.
America as a Maritime Nation.
Relation of the Medical Department to a Plans Division.
The Place of Mines in Future Naval Warfare.
A Mobilization Program for the Future.
Morale Building.
The Mission of the Naval Academy in the Molding of Character.
How to Best Educate and Convert the American People to the Need of a Strong National Defense.
The Navy in Battle; Operations of Air, Surface, and Underwater Craft.
Navy Spirit—Its Value to the Service and to the Country.
Based on a Major Ship Strength of Eighteen Dreadnoughts, What Do You Consider a Balanced Navy?
The Future of the Naval Officers' Profession.
The Naval Officer as a Diplomat.
Is the Present System of Training and Education for Officers Satisfactory and Sufficient?
The Role of the Navy at Peace.
Training Naval Personnel During the Next Ten Years.
Six Years of Promotion by Selection in U. S. Navy. Its Effect Upon Discipline and Morale.
The Employment of Retired Officers Separated from the Service by Reason of the Age in Grade Feature of the Existing Selection Law.
What Measures Should be Adopted to Create and Maintain a Balanced Enlisted Personnel of 120,000 Men?
Our Future Naval Policy Based on Existing International Treaties.
The Future Naval Continental Shore Establishments.
Shore Duty for Enlisted Men.
The Limits of Specialization in Naval Training.
The Effect of the 5-5-3 Ratio Upon U. S. Naval Strategy in the Eastern Pacific.
Armor or High Speed for Large Surface Vessels?
Airplanes and Submarines Versus Super-Dreadnoughts.
The Navy's Relation to the Nation in World Affairs.

United States Naval Institute Proceedings

PUBLISHED MONTHLY
EDITED BY H. G. S. WALLACE



U. S. NAVAL INSTITUTE

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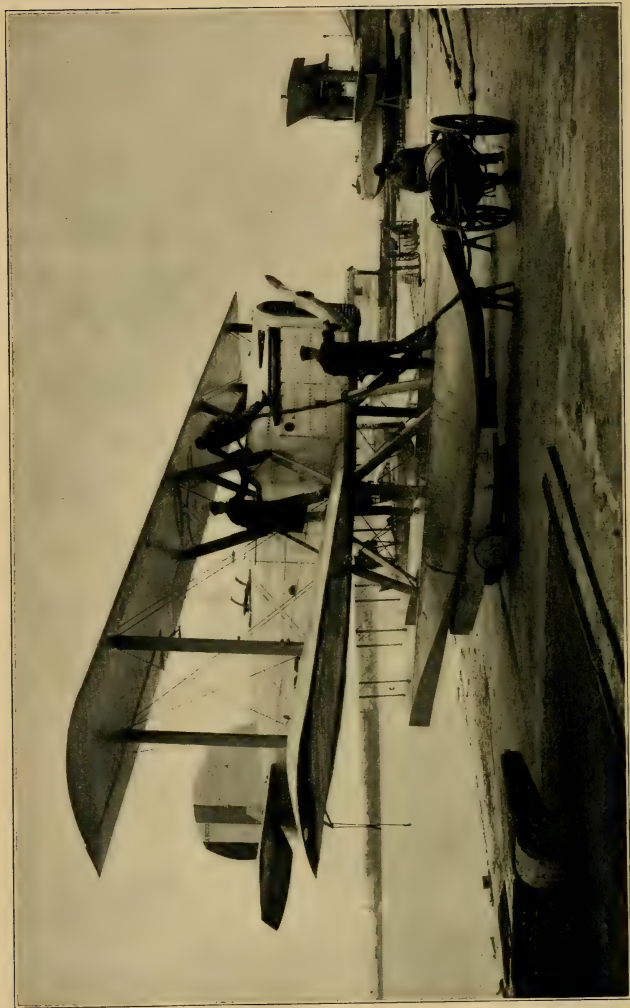
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1911



THE NEW TORPEDO PLANE
(See footnote opposite)

UNITED STATES NAVAL INSTITUTE PROCEEDINGS

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

OUR TACTICAL READINESS FOR WAR

• BY COMMANDER RUSSELL WILLSON, U. S. NAVY

The term "Tactical Readiness for War" may be used in a broad or in a narrow sense. In this article it is used in the more restricted sense as referring to our "Readiness for War" in the field of pure tactics. The collateral branches of tactics which are concerned with material and operating efficiency in communications, damage control, engineering and gunnery are here considered only for purposes of illustration and comparison.

On this basis "Our Tactical Readiness for War," may be defined as the degree of our knowledge and skill in the art of maneuver, position and combination,—the art which seeks to destroy the enemy by co-ordinating and concentrating against him the tactical elements of mobility, communications, protection and armament.

STANDARDS OF TACTICAL READINESS

In times of peace, no navy has been, or ever will be literally "ready for war." This is true in tactics as in any other branch

Editor's Note.—The Davis Douglas Torpedo plane, the latest development in naval aircraft, being prepared for a 1,200-mile flight from Washington, D. C., to Key West, Florida. This plane left the Naval Air Station, Anacostia, D. C., February 9, to join the torpedo and bombing plane squadron at Key West. Note the torpedo tubes under the fuselage.

of Naval Warfare. But in tactics, as in organization, strategy, logistics or plans, it is possible to establish certain standards of readiness which should be the goal of all naval endeavor. The first essential to forming an estimate of readiness for war, is an authoritative, complete, and definite statement of standards of readiness. There can be no measuring without a scale.

It is regrettable but true, that there has never been in our Navy such a set of standards. Various "War Plans" have provided the nearest approach to standards of readiness, but these standards generally have dealt with material readiness, and the number of days required to be ready for active operations. In many cases, and notably so in tactics, these requirements are so arranged as to provide no scale by which the state of readiness at any given time may be measured, and deficiencies detected. Fortunately this defect has been realized and will be corrected in the near future.

It may be assumed that such standards, whatever their form, will establish the following as essential to attaining a reasonable and practical degree of tactical readiness for war.

(a) Continuous, progressive, and exhaustive study in the theory and practice of all phases of tactics, including tactics of foreign navies.

(b) The results reduced to printed standard instructions in general use.

(c) Signal books, codes, and standard plans, essential to tactical operations in accordance with such instructions.

(d) Drill, exercise and instruction of the fleet under a continuing balanced program, to reach the highest attainable efficiency, in the technique of tactical operations.

(e) Research and experiment in the development of new tactical methods, weapons and types, and standard instructions for their use.

(f) A system of reports, comparisons, analyses, and permanent records of all tactical exercises, with a view to improvement in standard instructions and in technique of tactical operations.

PRESENT CONDITION OF TACTICAL READINESS

The above six essentials constitute the basis on which we should examine our "Tactical Readiness for War." In order that this

examination may lead to definite conclusions the following subdivisions will be considered separately:

- (a) The Principles of Tactics.
- (b) Major Tactics of the Balanced, or Ideal Fleet.
- (c) Major Tactics of our Fleet as it is Today.
- (d) Tactics of Subsidiary Operations.
- (e) Minor Tactics or Tactics of Types.
- (f) Tactical Research and Development.
- (g) Tactics of Probable Opponents.

(a) *The Principles of Tactics:*

The principles of tactics and their application under past and present conditions of naval warfare, is the subject of much naval literature. As a natural result, there has been very considerable study and discussion of tactical principles, and the War College has produced a brief and authoritative pamphlet on the subject, which is fairly well distributed and is generally accepted. In the near future the principles of naval tactics will be set forth in the War Manual or other authoritative, widely distributed departmental publication. This, of course, should have been done before, but when it has been accomplished we may consider that insofar as the principles of tactics are concerned our condition of tactical readiness is satisfactory.

(b) *Major Tactics of the Balanced or Ideal Fleet:*

The major tactics of the balanced or ideal fleet is a subject of double importance. It furnishes the basis, and the theoretical background for the major tactics of our unbalanced fleet; it also contributes toward a better understanding of the tactics of probable opponents, more fortunate in their building programs, or more successful in their Conference diplomacy.

In our Navy the major tactics of the ideal fleet has received exhaustive study in theory and on the Tactical Game Board. In fact, until recently, the study of major tactics dealt more with the hoped-for fleet, than with the actual fleet. The results of such studies appear in War College papers, notably "The Naval Battle," and form the basis of the present War Instructions. On the whole there is a quite definite conception of the major tactics of the balanced fleet accepted in our service. We are justified in

saying that as regards this subdivision of our tactical readiness, conditions are fairly satisfactory.

(c) *The Major Tactics of our Fleet as it is Today:*

The treaties of the recent conference left us with an unbalanced fleet—unbalanced actually, and unbalanced relatively when compared with the British and the Japanese Fleets. We have a cruiserless fleet—and this lack of cruisers will continue for some years. While it is true that the tactics of our present fleet must largely be based on the tactics of a balanced fleet, yet the element of cruiserless tactics constitutes a distinct problem. It is well to know what we would do with battle cruisers and light cruisers; it is better to know what the enemy will do with them, but above all, we must know what to do without them.

Cruiserless tactics is one special and particular problem of our Navy, now and for some years to come. Nevertheless it plays an inconspicuous part in our naval activities. It is studied on the Tactical Game Boards, and appears incidentally in the occasional tactical exercises of the fleet. Yet there has been little or no serious investigation to determine how battleships can substitute for battle cruisers or destroyers for light cruisers. The fleet schedules and the budget estimates do not recognize this problem. In this respect standard instructions are deficient or totally lacking and there are no published records or analyses of tactical exercises.

We are deficient in the major tactics peculiar to our own unbalanced fleet.

(d) *Tactics of Subsidiary Operations:*

Subsidiary Operations may include:

- Escort duty,
- Landing Force operations,
- Blockade,
- Raiding operations,
- Seizure of bases,
- Defense of bases,
- Operations against shore fortifications.

Compared with the tactics of the fleet engagement the tactics of such subsidiary operations are possibly of less importance,

certainly they have attracted less interest, and received less attention. But conditions may arise under which any one of these operations may attain surpassing importance, may in fact be the turning point in a war. For us, success or failure in seizing or holding a base in the western Pacific may mean victory or defeat. For the British in the World War, forcing the Dardanelles would have been a greater victory than crushing the German Fleet.

As a result of the last war we have considerable knowledge and experience and fairly standard instructions, in escort duty. We should remember, however, that our experience and our instructions are limited almost exclusively to conditions of submarine warfare, which may not recur in the same form. In the other types of subsidiary operations we have done but little. There has been some study and discussion, notably of the lessons of Gallipoli, and the work of the Control Force last winter was a beginning; but these problems have not been attacked seriously, and have had no considerable place in the fleet schedules of recent years. We have developed no standard instructions nor the special equipment which is essential to landing operations. We are strikingly deficient in the tactics of subsidiary operations.

(e) *Minor Tactics, or the Tactics of Types:*

Minor tactics, or the tactics of types, has unquestionably received considerable attention for years, but somehow, whether due to lack of continuity in planning, lack of experimental investigation, defects in our organization for tactical training, or lack of records and analysis, the results are not encouraging when judged by the instructions that have been produced, and the general standard of tactical knowledge.

The tactics of battleships has been studied in theory and in practice, and reduced to fairly complete written instructions. For battleships we have a workable signal system, a considerable degree of mutual understanding, fairly frequent drills and exercises, and less frequent reports and analyses. True, we have had an organized force of battleships for over twenty years, and have attained the present condition only within the past five years, but nevertheless, present conditions are what count, and we may take considerable satisfaction in the tactical readiness of our battle line.

Except for work on the tactical game board and the lessons of the Great War, the tactics of battle cruisers and of light cruisers is a virgin field. We cannot blame ourselves for this, perhaps, because we have no such ships, but in taking stock of our state of tactical readiness this item must be recorded.

The tactics of destroyers is on the mend. However, there can be scant satisfaction in this fact. We have had from 100 to 200 destroyers in commission for over four years, and last December it was necessary for the Department to rush through the Government Printing Office a book of Tentative Destroyer War Instructions, reconciling the even more tentative Destroyer Instructions of the Atlantic and Pacific Fleets, in order that destroyers could take part in the coming winter maneuvers on a common basis of understanding.

There have been for years considerable study and experiment in destroyer tactics, and several tentative pamphlets of doctrine and instructions. But after all, we have today tentative War Instructions for Destroyers, which in their entirety, at this moment,* have never been used. Of course there can be neither thorough training, mutual understanding, nor efficient co-ordination under these conditions.

The requirements of destroyer tactics are not entirely covered by the present signal books, and will be only when the Destroyer Instructions have attained some degree of permanence. Recently there has been some investigation of specific problems in destroyer tactics, notably in the Battle Fleet, and an encouraging thoroughness in the resulting reports and analyses. Everything considered, we can but say that in the question of destroyer tactics we have let much valuable time slip by, and while improving, are still far from being ready for war.

The light mine-layers are a product of the late war, and are few in number. In the past three years there has been some study of the tactical uses of this type, but as yet, we have no accepted doctrine and no definite standard instructions. The tactics of light mine-layers is undeveloped.

The tactics of submarines has received considerable attention since the war due largely to there being, in the Department, a section of Operations charged particularly with matters concerning

* January, 1923.

submarines. We have a book of Submarine Instructions, and the existence of this book marks a definite degree of progress. In the development of the tactics of fleet submarines we are of course deficient, and will remain so until we have fleet submarines in active commission. We are making progress in the tactics of the submarine, but there is much yet to be done.

Aircraft and aircraft carriers are new types—and their tactics are still in the development stage. It is too soon to pass judgment on the progress being made, but if we judge the future by the past, the prospects are none too bright.

From this brief discussion of minor tactics, or the tactics of types, we may summarize as follows:

Tactics of battleships—conditions fairly satisfactory.

Tactics of destroyers and submarines—after much loss of time and opportunity we are approaching the point where standard instructions are available, but as yet our destroyers and submarines are deficient in training and indoctrination.

Tactics of battle cruisers, light cruisers, light mine-layers, aircraft and aircraft carriers—either undeveloped or in the early stages of experimental development with nothing to promise that our indifferent success with older types will be exceeded with the new.

(f) *Tactical Research and Development:*

It is perhaps a mere commonplace to say that tactics, like any other branch of naval warfare, should always be looking to the future. Well-planned experiment, investigation, research, and development, were of increasing importance before the recent Conference, and are now more vital to our fighting efficiency than ever before in the history of our modern navy. Before the Conference we might expect a superiority in power and number of ships, now we may gain superiority only by developing a higher degree of fighting efficiency.

The importance of tactical development and research has been generally accepted in the abstract, but not fully applied in practice. Our tactical development has been slow in the past and has lagged behind development in other lines of endeavor, notably gunnery. We are deficient in tactical research and development, and will

probably continue so, until this element of tactical readiness receives in our service the recognition its importance demands.

(g) *Tactics of Probable Opponents:*

In the study of the tactics of other navies we have been fortunate in the associations of the war. Some say we have learned too much from the British, others, that we have learned too little. However, we can but admit that we have learned much to our advantage, both from their virtues and from their defects, and not only from the British but from the Germans.

Information of tactical development in a foreign navy is of double value. We may modify or adopt it for our own use, and we should certainly treasure it as a guide to the probable actions of an enemy.

Except under the unusual conditions of the late war, information of the tactics of possible opponents is difficult to obtain—especially that most desired—information as to new developments in weapons, types and methods. On the other hand tactical secrets are hard to keep—and given the same naval types, resulting tactical conceptions are apt to follow the same general lines. In this way the intensive study of our own problems is in reality a general study of the enemy's problems.

In general we have been quite successful in obtaining information of this kind. With the new tactical developments now in prospect it is of increased importance that no effort should be spared to obtain, disseminate, study, and act upon information of the tactics of other navies.

In the preceding paragraphs there have been set forth, under seven sub-heads, an estimate of the present condition of the tactical readiness of our fleet for war. If this analysis is substantially sound existing conditions may be indicated roughly by the following "marks" on the scale of 100, it being assumed for this purpose that a condition represented by less than 90 is not satisfactory.

On this basis the following "marks" may be considered as a conservative index of present conditions:

Principles of Tactics.....	95
Major Tactics of the Balanced or Ideal Fleet.....	90
Major Tactics of our Fleet as it is Today.....	60
Tactics of Subsidiary Operations.....	45

Minor Tactics or Tactics of Type		
Battleships	90	} average 60
Destroyers and Submarines	60	
Other types	30	
Tactical research and development.....	50	
Tactics of probable opponents	90	
Average		70

Reduced to the customary naval scale of 4.0, this means that assuming a 3.6 as a satisfactory degree of readiness, present conditions are represented by a 2.8.

In order to check these estimates, fourteen officers from admiral to lieutenant commander were asked this question, "If you gave gunnery in the U. S. Navy a mark of 3.8, what mark would you give tactics?" The average of the answers was 2.65.

But having reached these figures, let us have no illusions as to their mathematical exactness; their value is entirely relative. Some may consider them too low, others may consider them too high; still others may doubt that a condition of tactical readiness can be represented in this way. Let each officer make his estimate in his own way. The conclusion will be substantially the same: OUR NAVY IS STRIKINGLY DEFICIENT IN TACTICAL READINESS FOR WAR.

CAUSES OF PRESENT CONDITIONS

Accepting this conclusion—that our Navy falls short of practicable and reasonable tactical readiness,—let us examine the causes of this condition, with a view to finding a remedy.

A very good way of analyzing an only fair performance is to compare it with a much better performance. It should be profitable, therefore, to study our tactical development in comparison with our gunnery.

As a branch of naval endeavor in which excellence is sought, gunnery possesses certain advantages over tactics. Gunnery involves the activities and interests of nearly all officers and men in a ship. Tactics concerns principally the officers. Gunnery is susceptible of being placed upon a competitive, or more properly, a comparative basis. Competition or comparison to the same extent is probably not practicable in tactics. But when the engineering competition was established there was considerable

doubt as to its practicability, yet it has succeeded admirably and the same effort toward competition and comparison in tactical efficiency, may well do likewise.

But in any case, the excellence of our gunnery, compared with our tactics, cannot be accounted for on the grounds of general interest and competition. There are other and more potent causes.

We have had for years, definite standards of gunnery efficiency which in effect are standards of readiness. As has already been pointed out, such standards for tactics have not existed, and are being prepared now only in the more general terms of the proposed war plans. There are no definite standards of excellence in tactics. In this fact lies one cause of our failure to attain a satisfactory degree of tactical readiness for war.

Naval thought for years has been oriented on the battleship. But the battleship presents the simplest problems in tactics and the most complex problems in gunnery. Unconsciously this subordination of tactics to gunnery, as found in the battleship, has been accepted as applying to other types of vessels and to the fleet as a whole. This is a serious error. The destroyer, for example, combines the most varied and most difficult forms of tactics, with relatively simple forms of gunnery. In fact the gunnery of the torpedo, the destroyer's major weapon, is ninety per cent tactics. Tactics is at least co-ordinate with gunnery, certainly not subordinate to gunnery. Our failure to appreciate this fact, or at least our failure to apply it in practice, is a second cause of our present deficiency in tactical readiness.

Gunnery has been "organized" with an office in the Navy Department for over twenty years. At present the Office of Gunnery Exercises and Engineering Competition is an office of high prestige, sound organization and acknowledged efficiency, working in close co-operation with the fleet and with the War College. It has developed standard instructions, reports, and analyses, to a degree unknown in any other form of naval activity. It has done much for tactics and material development in the form of experimental practices. It has established gunnery and engineering in a position where they not only measure the success and efficiency of ships and officers, but actually dominate the fuel estimates and operating schedules of the fleet.

Now as to tactics—while it is true that considerable experi-

mental work in tactics, as concerned with gunnery, is carried out under the Office of Gunnery exercises, yet it is also a fact that there is not now, and never has been, an office in the Department charged with tactical exercises and possessed of the prestige, organization or efficiency required to place the tactics of our Navy on the same plane as its gunnery. There is no officer, or office in the Navy Department specially and directly concerned with tactical readiness for war; no office charged with standardizing and analyzing tactical exercises, and co-ordinating them with other forms of exercises. In the gunnery office of any battleship one can find a red volume which tells what Battleship Division Three did in Division Practice, Torpedo Practice, even Small Arms Practice, in 1914 or any other year; also why they did not do better, plus what they thought should be done the next year. Did anyone ever see such a volume concerning the fleet maneuvers of 1916 off Long Island, or of 1919 off Cuba, or the joint maneuvers of 1921, or any other tactical exercises? Such books do not exist. Tactics is not "organized"—it has no "home office" in the Navy Department. This is the third and perhaps the most important cause of our tactical deficiency.

If gunnery has a marked advantage over tactics in the organization and administration of the Department, let us see how the two compare in the fleet.

An examination of the fleet schedules since the war, with due allowance for tactical training involved in gunnery exercises, shows a ratio of approximately six to one between the time allotted gunnery exercises and the time allotted to tactical exercises. And this is not all. We know that the gunnery year is the basis of the fleet year, that the time allotted to gunnery is inviolate, while time available for tactical work is too often subject to unforeseen interruptions and the demands of economy. The fuel shortage of the past year and a half is an excellent example. Drastic economy of fuel was necessary, so every activity of the fleet was curtailed—except gunnery.

A year's work in one active destroyer division of the Atlantic Fleet in 1920-21 involved two or three torpedo practices, and from six to ten gun practices per ship. In tactics the same division was never drilled at sea as part of a squadron, nor took part in a squadron attack, nor deployed for an attack. This

division carried out its part of the fleet schedule, yet it had only two opportunities for night search, and made no division or section night attack. This same division, in one year, was drilled by radio, without flags, for two hours, and in twelve months neither made a smoke screen nor passed through a smoke screen.

These conditions need not be considered typical, for in the same year, under the more favorable operating conditions at San Diego, the destroyers of the Pacific Fleet accomplished much of permanent tactical value; and one destroyer division in the Atlantic, *by being excused from all gun practices*, contributed definite information concerning co-ordinated torpedo attack.

But whether deduced from schedules and operating records, or whether accepted from the common knowledge of all officers who go to sea, it is a fact that in the apportionment of the time of the fleet, gunnery receives a far greater share than tactics. Tactics does not receive its proportionate share of the time and effort of the fleet. This is the fourth cause of our present deficiency in tactics.

NEW PROBLEMS

Having set down these four principal causes of our tactical deficiency, we should next consider the new tactical problems which now confront us. Having done this we shall have established a sound basis for constructive suggestions for attaining true tactical readiness for war.

One problem is that of "Cruiserless Tactics." This subject has been discussed at some length, with the conclusion that we are defective in our development of the major tactics of our cruiserless fleet, and almost totally lacking in the minor or type tactics of cruisers. Our numerous destroyers offer an available, though unsatisfactory substitute for light cruisers. They can and should be used in the investigation and development of the tactics of light cruisers, until we have a proper proportion of that type.

There is no prospect of our having battle cruisers, and the extent to which battleships may be substituted for them is a problem in itself. At present the six older battleships are assigned to the Scouting Fleet. There were several reasons, including that of expediency, which influenced this arrangement. Another reason was the desire to develop the tactical use of battle cruisers. Be-

cause of the Treaty for Limitation of Naval Armament, this purpose must now be modified to include that of developing the use of battleships as substitutes for battle cruisers.

Can the older battleships "back up" a scouting line? If so used, could they successfully engage the enemy battle cruisers, or would 14-inch battleships be necessary? How will aircraft carriers affect this question? If acting strategically as battle cruisers, can battleships continue that rôle, tactically, if and when the fleets approach? The actual "joining up" of such a detachment before, during, or after deployment of the battle line, is an interesting study in itself. As weaker battleships, such ships would probably be in the center of our battle line, as substitute battle cruisers, they would be on a flank. These are but a few of the questions of "Cruiserless Tactics" which are now pressing for solution.

Another problem is that of tactical mining. There is a tendency, sometimes, to dismiss the subject of tactical mining with the remark that mines so used would be as dangerous to our fleet as to the enemy. While this may not represent a serious opinion, it indicates a state of mind which is not helpful, if we are to develop the use of this important offensive and defensive weapon.

This subject of tactical mining is mentioned in only the most general terms in existing publications. We simply do not know the possibilities, the limitations, or the technique of the tactical use of mines, and something should be done to remedy this defect. Research and experiment in this line are inexpensive compared with torpedo work and yet we have done next to nothing. As mines may be dropped from aircraft, tactical mining is, in part, another phase of the aircraft problem, but it is more than that; it is closely related to the question of "Cruiserless Tactics." The head of the enemy battle line with his battle cruisers and light cruisers is not only better protected than our line can be, but such protection is of greater offensive strength. The development of tactical mining is one of the few promising means of combatting or neutralizing this superiority at the head of the line. Surely we should spare no effort to develop it.

A third problem comes from our increasing control over visibility. We have some acquaintance with the smoke screen laid by surface craft, but this development has been limited almost

entirely to the Battle Fleet destroyers, and has not yet reached the stage of standardized instructions commonly accepted—with all destroyers trained in smoke screen tactics. Smoke bombs and smoke shells provide another form of smoke screen, the tactical employment of which is still in the development stage.

The smoke screen, by whatever means produced, is of increasing importance in the field of major tactics. The combination of the smoke screen and indirect fire presents a problem which, with proper development, offers one of the most promising means of attaining a tactical superiority over our probable enemies.

The star shell presents another phase of the same problem of visibility control. For years the searchlight has had its ups and downs as a method of illumination. The star shell offers new possibilities, and new problems in the field of night fighting.

The fourth tactical problem demanding our attention, presents the greatest difficulties and the greatest possibilities. It is the problem of aircraft.

In the whole history of war at sea, one of the most difficult, and one of the most persistent problems, has been how best to recognize at its true value, that which is new. We are all familiar with the errors of the over-sanguine—the failure of the dynamite gun, the torpedo, the mine and the submarine, to live up to the extravagant claims of their proponents. On the other hand, many have erred at the other extreme, and of the two, this latter is the more dangerous.

The following extract from the introduction to the *History of the U. S. Navy*, by J. Fenimore Cooper, written in 1839 should serve as a warning to the over conservative:

There is an opinion becoming prevalent that the use of steam will supersede the old mode of conducting naval warfare. Like most novel and bold propositions, this new doctrine has obtained advocates, who have yielded their convictions to the influence of their imaginations, rather than to the influence of reflection.

No vessel can be built of sufficient force and size, to transport a sufficiency of fuel, provisions, munitions of war, and guns, to contend with even a heavy frigate.

Steam may be, and most probably will be made a powerful auxiliary of the present mode of naval warfare, but it is by no means likely to supplant it. Fleets may be accompanied by steamers, but their warfare will be conducted by the present classes of heavy ships, since it is not possible

to give sufficient powers of annoyance, or endurance, to vessels propelled by steam.

The airplane will not make the battleship obsolete in the near future; but nevertheless, the airplane will have more effect on naval warfare than the torpedo, the mine, or the submarine. These weapons have influenced and continue to influence warfare at sea, yet aeronautics, still in its infancy, confronts us wherever we turn, whether it be to strategy, tactics, gunnery, or communications.

But after all, our problem is not so much what the airplane will eventually do to battleships, or to naval warfare in general; our particular problem is, what we should do to develop aircraft as our own weapon, and to devise counter-measures against aircraft as an enemy weapon. In doing this we should be most particular to maintain an open mind, and a determination to lead, and not to follow. In the art of naval war we are entering strange waters, with new currents, new beacons, and new dangers. In this broken sea let us pull out to meet each wave of progress, lest it come upon us suddenly and we be swamped.

Specifically, the following problems in connection with aircraft confront us at this time:

- Effect of aircraft on major tactics,
- The minor tactics of aircraft,
- The tactics and tactical use of aircraft carriers,
- Use of aircraft in screening,
- Use of aircraft in controlling visibility,
- Tactical mining from aircraft,
- Attack by, and defense against torpedo planes,
- Attack by, and defense against bombing planes,
- Use of aircraft observation in control of fire.

These problems will not be discussed in detail—any one of them might be made the subject of a separate article. It is only necessary to mention them to show that in aircraft alone we have problems more complex, more exacting, and more formidable, than those of the past which we have met with none too complete success.

CONCLUSIONS

If this discussion has been logically developed to this point, it has established the following facts:

First: That our fleet at present is deficient in tactical readiness for war.

Second: That there are four principal causes for this deficiency.

(a) Lack of definite standards of tactical readiness and tactical excellence.

(b) Failure to appreciate the co-ordinate importance of tactics compared with other forms of training and development, notably gunnery.

(c) Lack of an office in the Department bearing the same relation to tactics that the office of Gunnery Exercises bears to gunnery.

(d) Failure of the fleet schedules, and the budget estimates, to provide a due proportion of available time, effort, and fuel, for tactical training and development.

Third: That there now confront us new problems in tactics, more complex, more far-reaching and more vital, than the older tactical problems in mastering which we have met only the indifferent success reflected in our present condition of tactical unreadiness.

SUGGESTIONS FOR ATTAINING TACTICAL READINESS

These three facts must form the basis of suggestions as to what should be done in tactics to correct mistakes of the past, overcome present deficiencies, and provide for meeting the problems of the future. On this basis, I offer the following suggestions for attaining and maintaining, in times of peace, a practical and reasonable degree of tactical readiness for war.

First: Establish definite standards of tactical readiness in the war plans, and then develop standards of tactical excellence comparable with present gunnery standards.

Second: Indoctrinate the service with a sound conception of the co-ordinate place which tactics should occupy in the development, training, and readiness of the fleet for war, together with a clear understanding of how and why, under present conditions, tactics falls short of attaining this position.

Third: Expand the present Office of Gunnery Exercises and Engineering Competitions to include tactics in the same general relation to the fleet as now exists for gunnery, but with particular emphasis on co-ordination, standard instructions, data keeping, and analysis. This office to be known hereafter as the "Office of Fleet Training," or by other appropriate title, and preferably to be under the direction of a flag officer.

Fourth: Prepare the budget estimates and the fleet schedules so that the time, effort, and fuel available for development and training may be divided between strategy, tactics, gunnery, and engineering in proper proportion—such proportion to be determined by a sound estimate of the relative importance of these branches, *and a close study of the current degree of readiness in each.*

The first suggestion—standards of tactical readiness—should be met by the War Plans Division of Naval Operations. As to definite standards of tactical excellence, they should be developed by the fleet in conjunction with the proposed "Office of Fleet Training."

Toward meeting the second of these suggestions—a clearer conception of the importance of tactics, and of our present shortcomings—it is hoped this article may be a small contribution. But substantial progress in this respect can come only from united effort on the part of the Navy Department, the Fleet, and the War College.

The third suggestion—expansion of the Office of Gunnery Exercises into an Office of Fleet Training—proposes to do for tactics not only what has already been done for gunnery, but also to furnish the machinery for co-ordinating tactics and gunnery, and for obtaining continuity of training, and permanence of records in both.

The fourth suggestion—that the fleet schedules and the budget estimates be prepared on the basis of a balanced program of development and training—will be realized as soon as the fleet and the budget office have the opportunity to develop, in their relations with the proposed Office of Fleet Training, the same close co-operation that now exists between them and the Office of Gunnery Exercises.

We have today a fleet unbalanced in the types which compose it, and unbalanced in the training and development which measures its fighting efficiency. To correct the former lies largely with Congress, to correct the latter lies entirely with us.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

LETTERS OF A RETIRED REAR ADMIRAL TO HIS SON
IN THE NAVY

BY REAR ADMIRAL A. P. NIBLACK, U. S. NAVY

LETTER No. 14

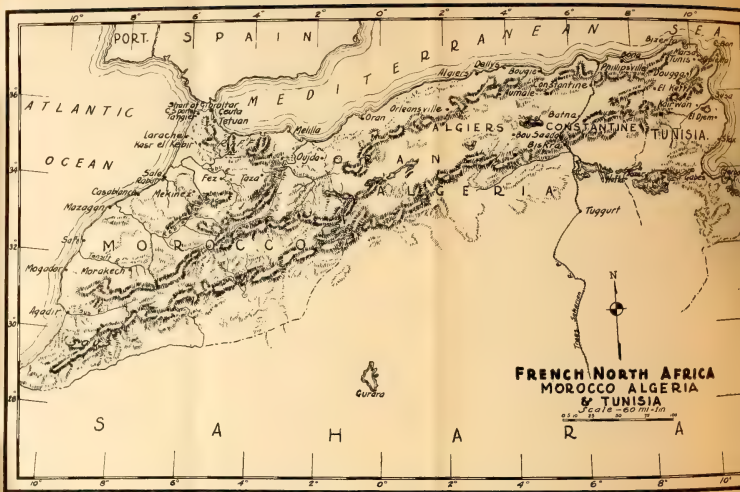
BARBARY PIRATES, ALGERIA AND TUNISIA
COLONIAL VS. PROTECTORATE FORM OF
GOVERNMENT

Hope Farm,
Long Island, N. Y.,
January 30, 1923.

Dear Son:

The city of Algiers is not as interesting as Tunis, for it is too modern, too French, and the native population has been too long in contact with Europeans. It is not even safe to loiter about the native quarter, the Casba, but that is more an indictment of our civilization than of the native. The "melting pot" has brought too much scum to the surface in that particular locality. In all other parts of North Africa the native shows to better advantage since his vices and faults are his own, and not borrowed. Other peoples' vices are usually not as tolerable as our own, but new ones have, at least, the merit of novelty. As less than a third of the world's population is white, it is always painful to see natives act too white. The more I am brought into contact with Moslem peoples, the more I realize how much they have to lose by changing their religion and their vices for ours. Their virtues and their vices are essentially elementary. Silent, honest, frugal, abstemious, courteous and fatalistic, they appeal to one after being jostled about by our civilization.

Having gotten to Algiers, you are at the beginning of the "Barbary Coast"; the rubber ring on which the young American



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Having gotten to Algiers, you are at the beginning of the "Barbary Coast"; the rubber ring on which the young American

Navy cut its teeth ; the training school of the officers of our Navy in seamanship and daring, enabling them in the single ship actions of the War of 1812 to bring home souvenirs of their prowess as seamen and sea-fighters ; for it was the wars against and the long blockades of the Barbary pirates which put the keen edge on our Navy. As a matter of fact, our war with Algiers was not until 1815, but those with Tripoli and Tunis are what I have in mind. From 1801-5 our squadron, successively commanded by Dale, Morris, Preble, Barron and Rodgers blockaded Tripoli and repeatedly attacked the defenses of that port. On February 19, 1804, Decatur burned the *Philadelphia* in the harbor of Tripoli, having previously taken personal part in other attacks on the city. In the same year, Mr. William Eaton, our Diplomatic Agent in Tunis, subsequently supported by a squadron under Commodore John Rodgers, ended the piratical attacks on our shipping at the hands of the Bey of Tunis. In 1815 our Government declared war on the Dey of Algiers and sent a squadron of ten ships under Commodore Decatur, which brought him to terms and also exacted indemnities from the Bey of Tunis and the Bey of Tripoli for violations of the Treaties of 1805. It was this vigorous example by our young country which encouraged European countries to finish up the job of putting the pirates entirely out of the business. Verily, the Navy is the long arm of the country to put the seal on diplomatic agreements and prevent them from being regarded as mere scraps of paper.

The treaty obtained by Decatur from the Dey of Algiers forever exempted our shipping from tribute ; abolished the enslavement of prisoners ; imposed conditions under which American citizens could only be tried in the native courts ; and exacted a payment of six million dollars for previous damages inflicted upon our shipping. As previously stated, Tunis and Tripoli were at the same time likewise put in order and fined for violations of treaties. In fact, for a peaceful republic, we seem to have gotten our money's worth out of the Navy by wars in every generation of our history. Next time it is called upon, we will need more Navy than we are at present allowed.

If anyone should suggest to you that we should economize on the Navy or the Army either, just tell them that we were in the recent World War only 584 days or 14,016 hours and it cost us

over \$1,500,000 each hour, not including \$750,000 each hour in loans to the Allies, which we are still looking for. One week of peace at that rate ought to furnish a Navy with the fighting edge, without Barbary pirates to practice on. The trouble with our country just now is that we have too much money, and nine pairs of trousers in every ten wear out in the seat.

The U. S. Navy is on its feet and, although swivel chair critics tell us that the aerial bomb has scrapped the battleship and replaced the gun as the supreme weapon of naval warfare, do not swallow such stuff! The French Navy is where it is today by accepting something "just as good" as the gun and battleship: viz., commercial destroyers, submarines and aerial bombs. The result to France has been the usual one of falling between two stools. With us the General Board has been a great stabilizer and has put the biggest guns possible on everything that can carry them. While our Navy is not as well balanced as it should be, it, at least, does not lack guns. In the recent discussion in England in the newspapers over the obsolescence of the battleship, the fight raged between retired naval officers. Not one single officer on the active list took part, and no one even suggested that the problem was merely that of re-designing the ship that carries the gun or altering it to meet the new conditions which have arisen. It is the business of active officers to use the instruments placed in their hands, and if the retired officers get scared over the alarming situation they, at least, showed commendable interest even if misguided. War being the application of science to putting the enemy out of business and making peace as soon as possible, it might seem that warfare would be revolutionized by every new invention. The joke is it is not. The gun remains the supreme weapon of naval warfare. The other talk is too often cheap advertisement to keep some back number in the spotlight. "Johnny, get your gun!" is the answer; but, at the same time, Johnny should not let them get his goat.

In the days of Rome and Carthage the eastern part of Algeria was called Numidia and the western part, including Morocco, Mauretania. An atlas will show you that two ranges of the Atlas mountains traverse North Africa from the Atlantic to the very interesting Gulf of Gabes, the northern range being known as the Mediterranean, or Little Atlas, and the southern as the Saharan,

or great Atlas. Algeria has 650 miles of broken coast line and Tunisia about 180 miles on the northern coast and 400 miles on the eastern coast; all of which coast line is indented by numerous bays, several of which have been made into wonderful harbors. In the main, however, most of the harbors are artificial, and it is the construction of adequate port facilities which calls for a large expenditure of money at this time and is one of the financial problems which France has to face. In Bizerta the French have a harbor and basin unique in their natural perfection, without any of the labor or expense which is usually entailed in the creation of a great commercial port as well as a naval base. Between Bizerta and the harbor of Tunis is the recently discovered but almost filled-in harbor of ancient Carthage, of which I shall tell you more later.

The land extending back from the sea beyond Algeria and Tunisia, to the slopes of the Little Atlas, is called the Tell and is extremely fertile and well-watered. This was the ancient granary of Rome as it is of France today. The plateau between the two Atlas ranges, back of the Tell, is not very fertile and is cut up by numerous saline lakes or schotts which generally evaporate in the dry season, leaving a thick solution of salt on the bottom; obviously the beginning of the waste lands leading to the Sahara. The Algerian Sahara beyond the Great Atlas, far from being *sandy* waste, is a rocky plateau with an average elevation of 1,500 feet interspersed with oases and some pasture land.

On the other hand, the southern part of Tunisia belongs to the Great Sahara Desert and is the quickest and easiest way to enter the Desert, since the town of Gabes, on the Gulf of Gabes, is actually an oasis of the Desert on the very edge of the sea. The adjacent oases of Tozeur and Nefta, well down into the sandy desert, are easily reached by railroad and caravan. This whole region of southern Tunisia is known as the Jerid, with its salt lakes and wonderful hot springs fitted up in Roman days as luxurious baths. It is astonishing and weird in traveling through eastern Algeria and central and southern Tunisia, to encounter, in desolate regions, the splendid remains of Roman cities like Timgad, Dougga, Pont du Fahs and Djem, as if abandoned in some great calamity. There are no such ruins else-

where because the conquerors and the churches have torn down the noble ruins for building purposes, whereas the nomads of this region have had no use for building material. The Roman cities nearer the sea have been wholly demolished, and the cities of Tunis and Kirawan have been largely constructed from adjacent Roman ruins.

As the mineral products of Algeria and Tunisia are iron, zinc, lead, copper, quicksilver, sulphur, phosphates, gypsum, salt, onyx and beautiful white and red marbles, it is not unusual to find that the presence of the mines and quarries was well known to the ancients. In the region of the Jerid the products are olives and olive oil, dates and esparto grass for weaving, but everywhere in North Africa back from the fertile coast lines are the innumerable flocks and herds of the nomadic peoples, sheep, goats, cattle, donkeys, horses, mules and camels, not the real camel with two humps, but the dromedary, for the two-hump camel is the Asiatic variety and the dromedary is the real ship of the desert. Nothing, however, hurts my feelings worse than to see one of these ships of the desert driven to a cart in shafts, as is done in Tunisia, and sometimes with a donkey as a side partner. It has been my good fortune to make two trips to the Desert, or rather to oases in the Desert, and to me the most interesting product of the Desert is the Bedouins, those curious gypsy-like nomads who are so different from the Arabs and who seem out of place and hangers-on to a civilization to which they add nothing but picturesqueness. They are scattered throughout the desolate regions from Persia by way of Syria and Egypt throughout the Sahara to the Atlantic Ocean and down to the negro countries in the southern part of the Sahara. Of nomadic Arab origin, tent dwellers, gypsies of the desert, citizens of no country, their hand is against every man and every man's hand against them.

It is very hard to give you an idea of the exact area covered by Algeria and Tunisia, but the definite bounds of Algeria are three times larger than Tunisia. The limits of each country toward the desert region are rather vague and being extended all the time. Roughly, Tunisia is as large as the New England States and Algeria larger than the New England and Central States combined. In neither case does this include the Sahara

desert region. For instance, when the President of France visited Algiers in 1922, he received with state ceremonials the Tuareg (Berber) chiefs, loyal to France, who had journeyed forty days by mule or camel to make the trip to pay homage to him. These men wore magnificent costumes, quite as handsome as those worn by hundreds of other native kaid's present, but they also wore veils up to their eyes, a custom due more to protection against sand in the desert than from native modesty, since they are war-like and make great soldiers.

The population of Algeria is over 5,000,000 souls and Tunisia less than 2,000,000. The other than native population is French, Spanish, Italian, Maltese, Turkish and Jewish. The native stock is predominately Berber, and the rest, Arab, Moor, Bedouin, and Negro. There is a large mixed element, descendants of the Arabs, Berbers, Romans, Phoenicians, and Teutonic Vandals. In Algeria there are about 170,000 naturalized French citizens in all but, in Tunisia, the Italians outnumber the French.

The Jews, numerous throughout North Africa, are an interesting complication in the population. There are nearly 60,000 in Algeria, still more in Tunisia and still more in Morocco, and all live under Arab and Moorish domination. It has been a rigorous one. Compelled to live in ghettos in the cities, to be limited to certain trades, and to wear a distinctive costume on the streets, the Jews, during all these centuries, have naturally remained a foreign element in the community. In their social life and domestic life they have preserved their own religion, traditions, and "kultur," as they have throughout the centuries in all communities, making them a "foreign element" in nearly all European countries. Some of the most beautiful costumes I have ever seen were the Jewish bridal dresses of a century ago, if pantaloons, compulsory for Jewish women in North Africa, can be called dresses.

To me, also, an interesting feature of North Africa is the Moors, a mixture of the Semitic Arabs and Hamitic Berbers, which latter are related to the Iberian peoples of Europe. After the death of Mahomet, the Arabs, in their almost world conquest, overran North Africa in the latter part of the seventh century, driving the Berbers to the Atlas mountains, ultimately converting them to Islam, and mixing with them according to the Mo-

hammedan customs. Prior to and during the conquest of Spain and their being driven out by Ferdinand and Isabella in 1492, the Moors developed as a real hybrid race, their civilization flowered, and they fell back into Africa, to dominate it for a considerable period. There is thus a race of Moors distinct from the Arabs and Berbers yet derived from a fusion of the two stocks primarily admixed during their incursion into Europe which had reached its high water mark when Charles Martel defeated them in 732 near Tours and drove them back across the Pyrenees into Spain, where they remained until entirely driven out by the Spaniards in 1492.

It is interesting to note that it cost France six billion francs and took her sixty years to accomplish the pacification of Algeria, whereas the establishment of France in Morocco and its pacification has taken only ten years and cost her only one-twentieth of the above sum. I have told you something of this French occupation of Morocco, and the brilliant administrative achievements of Marshal Lyautey, in that protectorate. Much of this is, of course, due to previous colonial experience. Algeria is a French colony, while Morocco and Tunisia are protectorates, due to unfortunate colonial experiments. When the war came suddenly in August, 1914, the Bey of Tunis and the Sultan of Morocco conscripted native troops to fight in France, while, on the other hand, the French Government did not feel itself strong enough in Algeria to use conscription and resorted to the voluntary system. The exact figures have not been published, but, in a general way, Morocco furnished 50,000 native troops for service in France and many times that number to fight in Morocco on the northern, eastern and southern frontiers against the wild tribes incited and aided by the Germans. Algeria, with more than two and one-half times the population of Tunisia, furnished 120,000 troops and Tunisia 90,000. This is one reason why the protectorate form of government has advantages over the colonial, since any unpopularity of any official acts or laws is borne by the government. The losses amongst the native troops were very heavy and one can see the effects of it in Tunisia today by the shortage of labor in the fields.

The French conquest of Algeria is interesting historically. Following Decatur's humiliation of the Dey of Algiers in 1815, his

successor had taken it out on European countries, and France had many outstanding grievances on account of piratical acts. A dispute had arisen over the payment of a debt owed by the French Government to two Jewish merchants in Algiers and, while the matter was pending in the French courts, the Dey, Hussein, who also owed the Jews money, wrote an undiplomatic letter to the King of France, who did not reply. At a reception of the Consuls in 1830, the Dey taxed the French Consul with not having received a reply and in an exchange of words, Hussein angrily struck the French Consul. It was the end of an imperfect Dey, for he and his Turkish régime were expelled by the French fleet and a strong army under General Bourmont. But the Arabs, under a young and able emir, Abd-el-Kader, fought the French, off and on, for a period of seventeen years but finally surrendered in 1847. The Kabyles (Berbers), however, kept up a desultory warfare, compelling France to maintain a military government until 1864, when Marshal MacMahon became Governor-General and Emperor Napoleon III came to Algiers and proclaimed a constitution and a regency. But serious insurrections occurred until 1871, when a civil government was established. In 1881, after negotiations with and pressure on the Bey of Tunis, France established a protectorate over Tunisia in order to safeguard her interests in Algeria and has made no such mistakes in dealing with the natives in that regency.

The administration of Algeria is vested in a Government-General, who is assisted by a Council. Under the law of December 2, 1902, the administration is divided into two parts, Algeria proper and the Southern Territories, with separate administrations and separate budgets, but both under the one Governor-General. The three departments into which Algeria proper is divided are Algiers, Oran and Constantine, which have their own councils but send delegates to the Superior Council at Algiers, which meets once a year for the purpose of discussing the general budget. Each one of these three departments sends one senator to the Senate at Paris and two deputies to the House of Deputies. The Southern Territories are constituted out of the southern portion of Algeria and the northern Sahara Desert.

All of the laws of Algeria are framed in Paris and the military expenditures of occupation are borne by the French Gov-

ernment. Justice is administered by sixteen courts, justices of the peace, commercial courts and a court of appeals, situated at Algiers. The French criminal laws obtain in these courts, but for affairs between natives and Europeans or natives and the French Government there are so-called *Bureaux Arabes*, which also supervise the religious affairs of the natives. The financial system of Algeria closely resembles that of France and the administration of the three departments is the same as in France, with the Prefect and the cumbersome bureaucracy. Algeria has its own budget, can grant railroad franchises, award public contracts and runs its own schools, but has the disadvantage of having its laws made in Paris and is much more controlled from Paris than Tunisia and Morocco, which is another advantage of the protectorate form of government.

In Tunisia the nominal head of the government is the Bey of Tunis, who is assisted by nine ministers in his cabinet. The French Resident General is Minister of Foreign Affairs and virtually the viceroy. Of the nine ministers seven are French and only two natives. There are thirteen civil and two military districts in which the native administrations, nominally under the Bey, are supervised by thirteen French *controlleurs*, with French and Tunisian assistants. All foreigners are governed directly by the French both administratively and judicially. The success of the Tunisian administration gave an excellent example for Morocco.

The first railway line was inaugurated April 2, 1875, known as the Bone-Guelma Railway, and now amounts to 1,500 miles in Tunisia and 2,400 miles in Algeria. You can now go from the Gulf of Gabys to Casablanca in Morocco on the Atlantic by rail. The great problem, of course, is the French Trans-Sahara Railroad to solidify the French colonial empire in Africa. In a few months the Cape to Cairo Railroad will be completed, running a little less than 3,000 miles completely through British territory. France is financially not able at the present time to push through the great railroad enterprise which will do as much for her own African colonies, but there is really no lack of French enterprise in North Africa considering the financial restrictions which limit them. They are pushing ahead and it is a revelation to see what they have so far accomplished and how well they handle the native population.

On December 17, 1922, a French expedition, in motor cars, left Tuggurt, the Algerian terminus of the Trans-Saharan Railway, and arrived January 7 at Timbuctoo, a journey of nearly 2,000 miles across the Sahara. There were four cars and eight persons in the party and oil had previously been stored at the end of the first 500 miles of the route, and 300 miles out from Timbuctoo. The wells along the route had been previously located, but over the central and most dangerous stretches the party has to be self-supporting in food, water and oil, and had to carry spare parts, and weapons to protect them against the savage raiders, and shelters from the even more savage extremes of the climate. The London *Times* says: "In the thin and clear atmosphere of the desert the sun scorches the ground by day, and at night the temperature often sinks far below freezing point. Fierce winds gather up the dry sand into whirling pillars of disaster, or drive it before them in a blinding and suffocating fog, rasping the lungs of men and the machinery of cars. Nor is the Sahara a flat plain along which, when weather permits, a straight course may be steered from oasis to oasis. It is a rugged country, scarred and carved by the erosion of water in the past, of blown sand in the present. The contours are disturbed by deep ravines and lofty hills. The traveler has to thread a devious way, now over shifting drifts of sand, now over the black teeth of the native rocks. That men can endure such a journey seems wonderful; that machines have conquered it, a miracle." This motor trip may be said to have blazed the way for the French Trans-Saharan Railway which will unquestionably be built when money becomes available.

France has put her hand to the plow in Africa and cannot turn back, nor does she mean to do so. She has, in her African empire, a new France and knows it. Financially France is weak; spiritually she is strong. Nowhere have I met more sincere, high-minded, self-reliant, public-spirited gentlemen than in the French Army and Navy in North Africa. Contact with the natives seems to have softened them after the shock and strain of the great assault which came to France in 1914.

Your affectionate

DAD.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

HOW THE MARINE BAND STARTED

BY MAJOR EDWIN N. MCCLELLAN, U. S. MARINE CORPS
MARINE CORPS HISTORIAN

So many and varying accounts have been given of the first organization of the Marine Band of Washington, that it is time that the real, and interesting, true story should be told.

The Marine Band did not just happen into being, nor were its beginnings in an Act of Congress. There always have been "Musics" in the Marine Corps—from its birthday on November 10, 1775, to date—but it was not until 1800 that the Marine Band had its inception; and like every one of the Marine bands playing today, it was first composed of volunteer musicians from the line.

At the end of the Revolution in 1783, the American people looked upon the soldier, sailor, or Marine, as a man out of a job. He was; and until July 11, 1798—when Congress authorized the Marine Corps—the only Marines were those serving in the State Navies, and a few serving on board the frigates of the "New Navy" in 1797.

William Ward Burrows, a native of South Carolina, but a Philadelphian by adoption, was the first Commandant of the Marine Corps. He was a lawyer, an organizer, and according to Washington Irving, "a gentleman of accomplished mind and polished manner." Of him the editor of *Poulson's American Daily Advertiser*, wrote in 1805, "his services in nursing the infant corps over which he presided, so useful to our naval enterprises, ought to be particularly commended by a grateful country." At first "Major Commandant," and later "Lieutenant-Colonel Commandant," it was he who fathered the Marine Band.

The first Headquarters of the Corps was under canvas a short

distance from the heart of the City of Philadelphia, which at that time—July, 1798—was the capital of the United States. The capital moved to Washington in 1800, and with it went the Marine Corps. Shortly after Headquarters arrived in Washington from Philadelphia, Major Burrows proposed to Secretary of the Navy Stoddert, that the Marines organize a band of music to be stationed "at the seat of the Government," where Headquarters must always be, for the President's as well as for other officials' use. He told him that the law had authorized "thirty-two drums and fifes," as the Marine "Musics" were called, and that the "Drum and Fife Major" could act as leader of the proposed Marine Band. The Secretary quickly approved the suggestion, and Major Burrows started at once to gather together the members of the band and to secure the necessary instruments.

Orders were issued for the recruiting officers to send to Headquarters all recruits who could play musical instruments, as well as any likely youngsters who might learn quickly. It was not long before there was a sufficient number of fifers, drummers, and privates gathered in Washington to form the band. Then the instruments had to be secured. But these cost money and there was no appropriation from which expenditures could be made to purchase them. However, there was the "Music Fund" formed by personal subscriptions by the officers for the purpose of paying bounties for the enlistment of "Musics." Instruments were paid for from this fund for several years, then from the appropriations for "Contingent Expenses" and "Music," until, in 1805, Congress appropriated for "Musical Instruments."

So far as the records show, the first purchase of instruments was made on an order issued August 31, 1800, by the Commandant to First Lieutenant Edward Hall, who was in Philadelphia, to procure two French horns, two C clarinets, one bassoon, one bass drum, and reeds for the clarinets and the bassoon. Lieutenant Hall was specially advised to have a "judge of musical instruments" select them. But the bass drum could not be obtained in Philadelphia, so the Commandant tried to have the drum made in Baltimore. The anxiety of the Commandant to have the instruments arrive in Washington is shown by his frequent letters to Lieutenant Hall in Philadelphia, trying to hurry them up.

At last, about November 1, the instruments did arrive. More

instruments were secured from New York. Then came the Commandant's gleeful announcement to Captain Franklin Wharton in Philadelphia on the first of December, 1800, that "each boy who is learning, can already play a tune." The problem of securing a bass drum, however, remained a difficult one to solve, and in the meantime, the band did the best it could without it.

Probably the first important appearance of the Marine Band was at the inauguration of President Thomas Jefferson, March 4, 1801. The next was in Washington on the Fourth of July in the same year. The *National Intelligencer* published a glowing account of that celebration. "About twelve o'clock the President was waited upon by the heads of Departments, and other officials civil and military, foreign diplomatic characters, strangers of distinction, the Cherokee Chiefs at present on a mission to the seat of Government, and most of the respectable citizens of Washington and Georgetown."

"Sometime after the company had assembled," it continues, "Lieutenant Colonel Burrows, at the head of the Marine Corps, saluted the President" while the Marine Band played "with great precision and with inspiring animation the *President's March*," as the Marines "went through the usual evolutions in a masterly manner, fired sixteen rounds in platoons, and concluded with a general *feu de joie*. The Band at intervals during the morning played martial and patriotic airs."

"At four o'clock a numerous and respectable company" assembled. Among them were the Heads of the Departments, other high officials, "and most, if not all, of the civil officers attached to the general government, the officers of the Marine Corps, and those of the frigates, with a number of military gentlemen at present at the seat of government."

"During the dinner, and until the company separated, a full Band of Music, detached from Lieutenant-Colonel Burrows's Corps, played patriotic and festive airs, and each toast was announced by a discharge of artillery, returned from one of the frigates."

But the band played without a bass drum, despite the earnest efforts that had been made to secure one. Late in July of the same year Captain Wharton in Philadelphia wrote his Commandant that "after many researches" he had "met with Frayley,

Drum-maker," who "was to show him a Bass Drum, which, if not suitable" he would not accept, but that Mr. Frayley had promised "to make one of any quality required." There is no further mention of the drum, so this last attempt seems to have been successful.

July 4, 1802, was a fête day at the Navy Yard, and the Marine Band was one of the attractions. "The arrangements at the Navy Yard were made, under the superintendence of Captain Tingey and Lieutenant-Colonel Burrows, with a very happy regard to elegance and accommodation," reported the *National Intelligencer*. "The ladies were received under a handsome marquee, until dinner time, when the company was arranged at an extensive table in the form of a hollow square, under a lofty tent covered with the colors of the frigates, which lay within view, ornamented with flags of all Nations."

The fame of the band spread, and it was in frequent demand for private as well as official occasions. The Marines of the band early learned that a little spare cash could be picked up. The "customary price" of the band for playing outside its duties was fifty dollars in addition to expenses. It played on many occasions in Washington, Alexandria, Georgetown, and other places. That it also played at official functions, both at the White House and elsewhere, goes without saying.

Lieutenant-Colonel Wharton succeeded Lieutenant-Colonel Burrows as Commandant in 1804. A full year later he was amazed to receive a letter dated February 28, 1805, from Captain John Hall, on the *Congress*, at Palermo, Italy, stating that he had regularly enlisted as Marines a "Band of Music" for the Corps, and had supplied them with instruments at the expense of the Corps. One month later, Captain Hall wrote to the Commandant from Messina, that under orders of Commodore Barron he had visited Catania "for the purpose of procuring a Band"; that he had "been fortunate enough to enlist fourteen good musicians for the Marine Corps"; that he had secured instruments at Messina, and as soon as they were received he would "render an account of all expenses" to the Commandant, according to his orders. Captain Hall further explained that he had enlisted this Band in accordance with orders received from Lieutenant Colonel Burrows before leaving, "and having engaged them

at the same rate as the rest of our Musick," he would bring them back with him on the *Congress*; and that he hoped the Commandant would be "pleased with them."

Lieutenant-Colonel Commandant Wharton, of course, was unaware of the orders Captain Hall had received from his predecessor, and was anything but "pleased" to have a second "Band of Music" on his hands. On June 29, he wrote Captain Hall that he had "never given any order for the collection of a band in the Mediterranean," and informed the Captain that it could "not be mentioned as belonging to the Corps"; also that "the Secretary of the Navy can never consent to allow two Military Bands for one Corps, and the Private Fund, hitherto used, has been done away with."

When Captain Hall arrived in Washington, he was given an opportunity to explain his band-making proclivities. On May 13, the Secretary of the Navy, the Commandant and Captain Hall "went into conference" on the "subject of the Italian Musicians." As a result of this conference the Secretary wrote Commodore Rodgers in the Mediterranean, on May 15, 1806, that "Captain Hall of the Marine Corps, having while in the Mediterranean without competent authority but under" direction of Commodore Barron, "enlisted a number of musicians," and caused considerable inconvenience, this letter was being written with the hope that he would not fall "into a similar error."

The last heard of "Captain Hall's Band of Italians" was on July 31, 1806, when the Commandant ordered that the "Italian Band" live in "quarters within the garrison" and be "under the same regulations as the Old Band is and has been."

And so the Marine Band, highly appreciated and warmly commended, continued its informal existence for many years.

In 1845 the Brigadier-General Commandant made a strong plea for the Marine Band to the Secretary of the Navy, George Bancroft. But in spite of this, and subsequent recommendations, it was not until eleven years later that Congress took any specific notice of the Marine Band. On August 18, 1856, President Pierce approved legislation giving four dollars additional monthly pay to the members of the "Corps of Musicians known as the *Marine Band*, stationed at the Navy Yard in Washington City," to begin May 1, 1856. This law provided that the pay was "to

continue as long as they shall perform, by order of the Secretary of the Navy or other superior officer, on the Capitol Grounds or the President's Grounds." Finally on July 25, 1861, President Lincoln approved an Act of Congress that authorized the enlisting of One Principal Musician and "thirty Musicians for Band," in addition to the Drum Major, who had been authorized from the beginning of the Corps.

Thus, after an informal existence of more than sixty years, had recognition finally been accorded by Congress to the Marine Band—the famous "President's Own"—that has played for every president except George Washington.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE ART OF SHIP-CONTROL

COMMANDER W. C. I. STILES, U. S. NAVY

It seems characteristic of the state of ship-control in our Navy that the very name assigned to this branch of our profession was pinned on it by a group of ordnance experts, and was made to include everything in the battle activities of a vessel not directly connected with launching projectiles at the enemy. Thus, though a careful distinction is drawn between fire-control and torpedo-control; such diverse activities as the maintenance of water-tight integrity, the repair of structural damage, the operation of the ship's power plant and propelling machinery and the administration of first-aid treatment, are indiscriminately lumped with the actual management of the vessel under this all-embracing classification.

Strictly speaking, however, the name "Ship-Control" means exactly what the words indicate; that is, the operation of controlling the course and speed of the ship. It is distinguished from navigation in that navigation has to do with the geographical position of the ship, while ship-control concerns itself entirely with her position with reference to other vessels. It has to do, therefore, with tactics and turning circles rather than with astronomy and surveying. While navigation is a science, based on mathematical formulæ and geometrical constructions; ship-control is properly classed as an art, being based largely on judgment and the proper evaluation of conflicting and often intangible factors.

It is unfortunate that this basically important feature of our profession has been allowed to develop as best it might without any organization under which advances might be consolidated and the necessary material developed in its most useful and convenient form. While the mechanical devices under the gunnery

and engineering departments have been brought to a high state of excellence under the supervision of officers experienced in their practical use, those employed in ship-control have been only slightly developed, and this almost entirely on the initiative of their civilian manufacturers. Even on our most modern ships the lay-out of our bridges seems to have been predicated more on an attempt to make the necessary gear fit into a space arbitrarily provided for it, than on an effort to arrange things in the most suitable and convenient manner.

With regard to the technique of ship-control, the same lack of a single source of supervision and authoritative information exists. Particular features of it are covered by widely separated authorities, but in general each of us is left to learn what he can by trial and error, frequently the latter. It is everybody's business and therefore nobody's business.

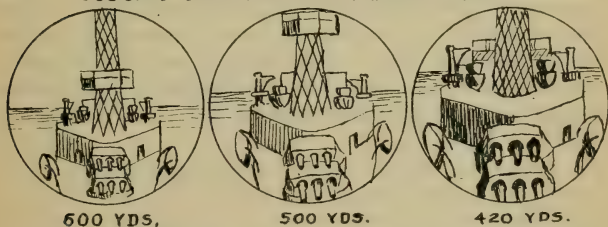
Success in this line of endeavor is popularly held to be dependent on the "nautical eye," a God-given instinct to do the right thing at the right time, which some of us are thought to have born in us and others not. In reality this nautical eye is simply an ability to judge distances and angles rapidly and fairly accurately, coupled with a knowledge of the factors affecting the turning of a ship and the judgment necessary to predict their combined effect. This ability is, as a matter of fact, often obtained by long experience and costly initial error; but in these days of restricted fuel expenditures it is particularly necessary for us to ground ourselves thoroughly in the underlying theory. Moreover, we should lose no opportunity to observe critically the maneuvers of our vessel by others, in order to avoid their mistakes and to profit by their experience.

Of course, the bridge of a ship at fleet maneuvers is no place for a gathering of spectators, particularly more-or-less garrulous ones. However, a great deal of value may be obtained by selecting a spot from which the movements of the steering gear may be observed. It is quite an interesting sport for a group of officers off watch to congregate in such a position to read the signals and to decide what they would do. Some valuable experience may be obtained by observing the slick of the next ahead as you approach the turning point and saying "Turn" when you think the instant has arrived for putting over the rudder. But noting

the difference between your judgment on this point and that of the Officer-of-the-Deck, and observing the results from his decision, you will rapidly acquire the faculty of guessing this matter correctly.

Another interesting amusement is to practice guessing distances by eye and to compare your results with those of the stadimeter. After a little practice at this art quite surprising results can be secured, particularly by making use of one or two little dodges. A common one is to observe the exact amount of your next ahead which is visible in the field of your binoculars when she is at exactly standard distance. By fixing this in your mind, a glance at her through your glasses will permit you to estimate her actual distance within a probable error of ten or twenty yards.

JUDGING DISTANCE WITH BINOCULARS.

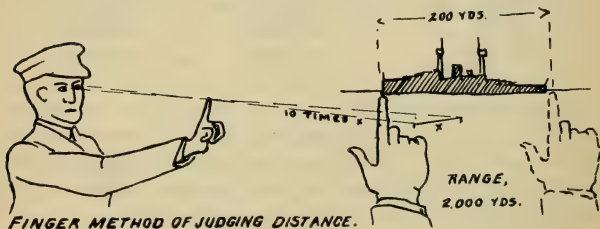


A more convenient method on battleships is to line up the jackstaff of some point on the ship ahead. On my last ship, for instance, from my position at the conn on the upper bridge the top of our jackstaff was even with the stern chock of the next ahead when at 500 yards. This was exactly true, of course, only for one particular position on the bridge, and for my particular height of eye above the bridge deck. When in the conning tower another expedient had to be resorted to. From here the jackstaff was almost up to the horizon, and therefore could not be used with any accuracy. However, there were a series of insulators on the fore stay, and by getting the main truck of the next ahead midway between the third and fourth insulators, I could be assured that the distance was correct.

All of these indications, of course, grow inaccurate when the ship is pitching, but by splitting the apparent movement of the jackstaff workable results may still be obtained.

Visual acuity may also be made use of. On one ship which I followed for several thousand miles there were two air ports close together on each side near the stern which, to my eye, blended together at about 500 yards. At 480 yards they stared at me like a pair of eyes, while at 520 I could barely distinguish that there was more than one. This was but a chance applicable to my particular degree of eyesight, but it seems quite probable that in many cases some such indication could be discovered by close scrutiny. In this particular case the results were quite surprisingly accurate.

Another means of judging distance which is interesting and sometimes useful is by the finger method. It is based on the principle that the distance between the eyes is one-tenth of the distance from the eye to the end of the extended finger. This varies somewhat in individual cases, but by measuring the distance between the centers of the eyepieces of your binoculars when adjusted to your eyes and multiplying this distance by ten, the exact way of holding the finger to get the desired results



may be readily acquired. Having done this, you extend the finger and align it with one eye on one end of an object of known length. Then quickly observe with the other eye without moving the finger, and note how many yards along the length of the object the finger appears to be displaced. The range of the object will be ten times this distance. If the object be a ship of known

length it will, of course, be necessary to make a mental correction to give the apparent length in a line perpendicular to the line of sight, unless you find yourself directly on her beam.

I had occasion to use this method once in maneuvering around a totally disabled ship with all lights out, when all other methods of rangefinding failed; and was able to tell at once that we were far enough from her to permit us to turn 180 degrees toward her without danger of collision.

A simple trick for estimating long ranges useful in high visibility is to be found from a glance at Bowditch's table for determining the distance of the sea horizon from any height. From a battleship's bridge this distance will be about eight and one-half miles. Therefore, if a similar ship is hull down until only the top of her bridge and upper works are visible, her distance will be seventeen miles. By a rough interpolation between these points a very fair estimate of her distance can be obtained; and I have found this wrinkle quite useful in approaching a rendezvous to give a fairly accurate estimate of the time of arrival.

In addition to estimating distances by eye, it is well to have some means of judging relative bearings with reasonable accuracy without resorting to the pelorus. Bearings thirty degrees forward and thirty degrees abaft the beams are most useful in tactical formations, while approximate bearings broad on the bow and on the quarter will save many minutes waiting at the pelorus when taking bow and beam bearings on navigational marks. Usually it is fairly simple to establish these bearings by lining up bridge stanchions and other fittings, and this knowledge will serve you well when a quick decision is required.

Another kink I have found useful is to take rapid relative bearings with a gyro pelorus by simply pointing the navigational rangefinder end on at the object, or by sighting through the rings of the mounting, and reading the scale on the outside of the pelorus bowl.

Judging our angle of bearing from another ship, or in other words, her course with reference to ours, is often a question of great importance, and one in which the unaided eye must frequently give the only answer. Here familiarity with the details of the ship observed will be of great value. From positions nearly ahead or astern the relation of her masts will give

the clearest indication, but from positions near the beam the boat cranes, even at long range, will frequently give results which compare quite favorably with those of the most elaborate plotting system. Moreover, the eye detects a change of course at once, whereas the plotting room only gradually becomes aware of it from its effects. Within, say 3,000 yards, it is often easy to keep abeam of another ship quite accurately by observing when her chart house windows are lined up so that you can see right through them.

In keeping distance in column in a compound formation it is frequently possible to predict and anticipate the fluctuations in speed by the division guide by observing our bearing from the corresponding ship of the guide division and estimating whether this ship is ahead or astern of her proper station. With battleships nearly 200 yards long and only 300 yards of open water between ships, it is not difficult to tell whether the guide division is opened out to any extent.

Success in making turns in formation rests primarily on a thorough knowledge of the ship's tactical data. This information is frequently kept securely hidden in the Navigator's files; and at that, is sometimes incomplete and inaccurate. It should, of course, be conveniently available to all officers, and should preferably be prepared in the form of easily visualized graphs rather than in impressive but obscure columns of figures. What is required on the part of the officers using it is not, of course a knowledge of the exact figures, but a practical ability to visualize the advance and transfer in any particular turn, to fix by eye the track ahead of the ship which she will follow when the rudder is put over a certain amount.

This ability is acquired first by a study of the turning curves and an analysis of the comparative effect of various rudder angles and the different methods of handling the engines. Secondly, it is perfected by critically observing actual performances, and particularly by finding an explanation for the discrepancies which will continually be observed between the ship's actual performance in a particular case and the theoretical performance deduced from the turning curves.

A common cause for an apparently excessive advance is to be found in the fact that the steersman will frequently give the

ship a slight sheer in a direction contrary to that of the turn just before the turning point is reached. The rudder used to make the turn proper will then be employed at first wholly in "meeting her," and the ship will be very sluggish in responding to it.

Another factor, frequently of marked importance in handling some of our battleships, is the reluctance of the ship to turn away from the wind, coupled with a tendency to turn rapidly toward it. This is due to the full, bulbous noses of our recent ships, as well as to the fact that their after deadwood is almost entirely cut away. This will be quite strikingly observed when the ship is in drydock. Her forefoot stays right down to the keel blocks until within a few feet of the point of her ram, while aft one may stand under her propellers and observe the spacious arch of her after-body overhead. The upshot is that her stern is free to drift off to leeward with little resistance while her bow is firmly anchored in the water. This effect is counteracted to some extent by the fact that the bow is higher above water than the stern, but the tendency is still generally for the stern to resist swinging toward the wind.

It is important also to get a clear practical idea of the retardation data, that is, how long the ship carries her way under various circumstances. A consideration of the figures in the tables will form a good basis for judgment, but allowance must always be made for the retardation due to the use of the rudder in cases where a turn is to be made.

For instance, when joining up astern of another ship at full speed it will be necessary to press her rather closely and to keep full speed on until the final turn is almost completed, if approaching at an angle of sixty degrees or more from her course. Otherwise the retardation of the final turn will more than compensate for the increased revolutions, and the ship will drop astern considerably before any correction can become effective.

Sometimes this feature may be used deliberately to drop back, but this is generally considered bad practice and is, moreover, difficult to accomplish without throwing the ship off her course. A practical case which frequently occurs is when the ships are approaching anchorage, and have stopped their engines preparatory to anchoring on signal. If your ship holds her headway

longer than the leader you will jamb up on her unless something is done about it. Backing is likely to throw a scare into the ships astern, but by freely using the rudder in large amounts while she still has steerageway you may be able to kill her speed sufficiently to keep your position. The effect of the use of the rudder in such cases is almost immediate, whereas a change in the engine revolutions, unless a drastic one, will not produce a noticeable effect for several minutes. Such an expedient should not be resorted to without any consideration for your next astern, as she will have no means of knowing what you are doing, and may pile up on you in a manner perfectly incomprehensible to her officers.

The old-fashioned idea of ship maneuvering was to allow of no variation from the precise mode of procedure prescribed in the instructions governing the case. The theory was that one should determine in advance the exact instant of starting the maneuver and then proceed along invariable lines, putting his rudder over a certain standard amount and easing it at a predetermined point regardless of the results. If his initial guess could accurately forecast all the factors which would influence his ship before the maneuver was entirely completed he would come out at the right place; if not, as was most frequently the case, he was simply "out of luck." This conception of maneuvering should of course always obtain on board the guide ship, in order that the others may have a definite standard to conform to; but it is believed that, with regard to the other ships, a more modern conception is that the primary duty of the Officer-of-the-Deck is to exert all his faculties to keeping his ship at all times in position, and that he should use his judgment not only in commencing the maneuver but in seeing it through to a successful completion. In fact the "Art of Ship Control" is believed to rest largely in the proper use of his judgment. The latitude allowed in such cases, is, of course, strictly limited by a consideration of the effects of your variations from the strict procedure on the maneuvering of the other ships, particularly of the next astern; but you cannot afford to surrender all control over the outcome of the maneuver immediately on giving the order "Right standard half rudder."

Much has been written on when to start a turn in column

formation, but little on how to finish it; and it is your final position which decides whether you get a "Well done" or a position pennant on it. It is now not only a general custom but almost a necessity to steer the ship around in the wake of her next ahead, and any ship handler who undertook to do otherwise would come to grief nine times out of ten. Many factors enter into this game—the state of the wind and sea, your condition of trim and the probable shifts of rudder by your next ahead. You can generally tell if she uses more than usual rudder angle by the way her wake boils up under her stern. By this indication, and by observing whether she appears to start turning inside or outside, you can generally get a fair idea of your probable procedure. Having, let us say, started your turn properly with your bow about half the ship's beam inside of her wake, you must watch her wake intently and at the first indication that your bow is getting closer to it give her more rudder. This can be readily observed by noting where the band of white water appears to cross your jack-staff. If it shows a tendency to creep downward, soak her with more rudder; if it rises, ease the helm quickly before you get inside.

When within three or four points of the finish of the turn it is well to direct your attention to the aspect of the ships ahead. Sometimes by easing the rudder you can make her slide easily into position, again it will be necessary to swing her hard and fast. In this latter case there is considerable danger that you may swing past and botch the job. It is well to swing her rapidly at first, and then ease up when you have the situation well in hand. In extreme cases you must hold your turn with hard over rudder and meet her hard at the last moment. This, of course, is bad practice, and may reduce your speed enough to get you into difficulties with your next astern. Unless you were well closed up at the beginning of the turn it may be best to let her go outside deliberately and run up to the position pennant.

This last example calls attention to another little trick in ship handling. If you find yourself behind your proper position in column when a turn is made, turn early and with easy rudder and you will catch up, whereas if you were a trifle too close it may be well to hold on until the last minute and then give her all you've got. The effect of this latter procedure in a turn as

large as ninety degrees is frequently pronounced, and it is perfectly possible to overdo it. There is also a constant danger that you may delay too long and be forced to turn outside, so that it is necessary to be sure of your ground and to use plenty of discretion in attempting this procedure.

In making simultaneous turns with the guide, everything depends on your getting started together. If you do not you will most certainly end up off the correct line of bearing; but by the time the bearing of the guide has changed appreciably, to give you an indication as to which way you are going to come out, it will be too late to apply the remedy effectively. The solution lies in closely watching the masts or cranes of the guide when the maneuver is started. If they commence to move off from each other before your own ship has started to swing, it will be necessary to put on more rudder until you think you have caught up with her.

In the rapid succession of simultaneous turns so much used in modern tactics it is frequently possible to adjust your position to advantage by introducing little variations of your own into the maneuver. For instance, if you are behind your station and the signal calls for a 45-90-45 combination you can readily catch up by making it a 40-80-40 evolution as far as your ship is concerned. By so doing you will have saved twenty degrees of turning, and your course will have been always slightly more in the direction of the advance of the fleet than that of your division mates. Also, since you were probably going at more than standard speed at the time the evolution was signaled you will probably have preserved your correct bearing throughout the maneuver.

Similarly in one of these combinations, one turn may be doctored to undo the error made on the previous one. For instance, suppose that in the previous example you had finished the first forty-five degree turn behind your proper bearing. If you make the ninety degree turn in a regulation manner you will then be ahead of your position. What you must do is to make the first part of the ninety degree turn slowly with easy rudder, and then jamb her over at the finish. It is well to have an observer at the gyro pelorus singing out constant bearing of the division

guide during the turn. Otherwise you are quite likely to overdo the correction.

When steaming on a line of bearing I have found it a great convenience to use the Battenburg Course Indicator as a plotting board. The system of parallel lines is set to the course, and one of the position bars is adjusted to indicate the correct bearing and distance from the guide, while the other is set for the actual bearing and distance at the moment. In this way you can tell at a glance, for instance, that you must bring your ship fifty yards toward the guide and draw ahead seventy-five yards and it is almost impossible to get balled up and do the wrong thing.

The Battenburg is also an excellent help in movements involving change of bearing. Of course, the course and speed necessary are now given you in the tables, but by using it simply as a plotting board to show your distance from your proper position and the speed with which you are approaching it, you have something better than guesswork on which to base your decision as to when to go to standard speed. It will generally be found in these evolutions that it is necessary to turn up on the final course some little time in advance of the time that you get to your proper bearing. The position in which the ship plots with reference to the line passing through the final position will enable you to start this turn at the correct time.

We found the Battenburg so useful as a plotting board that we had it habitually mounted on a shelf directly in front of the Officer-of-the-Deck, though it was seldom used to determine the course to steer in any fleet evolution. For special problems, after experimenting considerably with Course Indicators, Mooring Boards and various homemade contrivances, I have personally reached the conclusion that the best results are obtained with the Universal Drafting Machine. By mounting this conveniently on the bridge, using a plain piece of chart paper with a thumb tack inserted point up through its reverse side, and filing a notch at the zero point of the drafting machine scale, you have a means of rapidly laying off bearings and distances, and drawing parallel lines; and, if you know how to go about it, you can solve any problem. Moreover, you are not confused by an elaborate system of lines already on the chart; and the same lay-out, with the

anchorage chart substituted for the plain paper, will be most convenient in finding your way to your proper berth when the day's work is done.

Maneuvering from the conning tower involves additional complications, and one of the first ones encountered is the question "Whose job is it?" The Captain sometimes feels that with the increased difficulties to be encountered and the lack of all-round vision, it is a matter that should receive his personal attention. If this takes place the Captain becomes thoroughly occupied with the duty of keeping the ship 500 yards from the next ahead. He can spare no time to observe the enemy, or to direct the fire of his ship to the proper target; and these duties automatically devolve on the Navigator. Their true rôles are thus reversed—the Navigator fights the battle and the Captain conns the ship. Of course this situation obtains only at maneuvers, where the practical handling of the vessel is a matter of much more pressing importance than the engagement with an altogether imaginary enemy. Nevertheless it would appear that such a situation is an artificiality directly at variance with the requirements of war conditions.

The principal difficulty experienced in the conning tower is due to the lack of free vision, producing a sense of insecurity which, however, gradually wears off with time. The generally inconvenient location of the instruments, and their frequent inadequacy, are other difficulties which might be removed by attention to the details of design and of layout. With characteristic disregard for the primary function of the conning tower, there were recently installed in our battleships a couple of extra-loud radio buzzers which rendered verbal communication impossible. The reason for this appears to have been that the chatter of the Captain disturbed the third-class radioman, and it was therefore decided to drown him out.

This brings me back to the lay-out and general arrangement of ship-control gear, which generally leaves much to be desired. A turret officer has his instruments and communications disposed about him where he can see them all without turning his head and reach them all without altering his position. In the engine room the gauges and controls are brought to a central point from which

the condition of the entire operating plant may be seen at a glance. On the bridge, however, the Captain of the ship, in most cases, must habitually crane his neck to read the rudder angle indicator, and requires assistance in even such a simple piece of work as stopping both engines.

The officer conning the ship at maneuvers wants a fairly unobstructed vision from ahead to about thirty degrees abaft the beam. It would be well to have him so located that it will be difficult for a messenger to pester him on trivial subjects, and the ship's organization should be such that he is relieved from these distractions. He cannot steer the ship himself; but he can, and should personally operate the engine telegraphs and the revolution transmitters, as well as the whistle and siren. He should have under his eye a gyro compass, by means of which he can check the course, a rudder angle indicator from which he can observe the actions of the steersman, and a reliable means of knowing just what speed the engines are actually making. He should have on his compass a means for taking bearings, both gyro and relative; though normally he will depend on an assistant for this information. He should have his signal book on a convenient shelf before his eyes, and beside him a rack for the Battenburg Course Indicator, on which the actual and required positions may be plotted, either by himself or by an assistant. If a chart board can be installed alongside him so that he can personally observe the plotting, he will then be able to have a personal supervision over all the elements of his job without leaving his conning station. He will ordinarily find it more convenient to ring up a change of speed on the engine telegraph himself than to give the order to a partially trained, second-class seaman and then watch him carry it out. However, when coming alongside anything, he may very easily shift his position to the wing of the bridge and have a junior officer or a well-trained quartermaster handle all the instruments for him. The old idea that a man must necessarily be uncomfortable to be efficient has now happily passed away. Thus, there would seem to be no real objection to having a seat for him. There would then never be the slightest doubt as to just who had the deck. When relieved he would not only turn over his job, but would also abdicate the throne.

Greater attention might also be paid to providing convenient

locations for the various assistants required in maneuvers, from which the reports may be received by the officer at the conn without the necessity of a lot of loud singing-out and confusion. It is a very well-known fact that on a bridge where there is a chronic uproar it is but seldom that the maneuvers are smartly carried out. Reports of bearings and distances fly thick and fast, each man trying to outdo the other in rapidity and volume; the man at the wheel gets jumpy and nervous; and the officer at the conn is distracted and rendered incapable of exercising his best judgment. The whole effect is that a frightful emergency is about to take place, and as like as not this feeling will be justified by the results.

It appears that the reason for the unsatisfactory state of ship-control matériel is not that the matter is overlooked, but that it is considered by a great number of specialists;—but specialists in other lines. The lay-out of bridges of new ships is referred to ordnance experts, engineering experts and strategical experts. Such a variety of opinion is obtained that the final result is always an attempt to reconcile divergent viewpoints, and pleases nobody,—least of all the persons who will have to use it. The design of bridge instruments is entrusted to electrical engineers, who can do little more than to reproduce the same old devices in slightly improved form. The electrical telegraph, for instance, is made to look exactly like the older mechanical telegraph, though an instrument similar to the smoke telegraph would do the same work, and two might be mounted in the same case. The saving in space in our conning towers which could be realized by mounting all the instruments and controls compactly on a single panel would be considerable, and the increased ease of operation would be an even greater advantage.

We must conclude from these conditions that we ourselves are considerably to blame. The shore people will give us what we want, provided that we express our wants loudly and frequently enough. Ship-control is somewhat of a specialty, though an unrecognized one, and if those of us who are experienced in this line will evolve and advocate constructive ideas,* instead of conceiving our entire duty to be to do the best we can with the gear furnished for our use, we will eventually succeed in getting the material best suited to our special requirements.

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THE ORIGIN OF WATERTIGHT COMPARTMENTS

BY CAPTAIN ELLIOT SNOW (CC), U. S. NAVY

Two hundred years before Columbus discovered America, in 1292 to be exact, Marco Polo and two of his Venetian companions set sail from a Chinese port with a splendid squadron of ships which had been furnished and outfitted by Kublai Khan. The *Travels of Marco Polo*, which record the events of this and his other travels, contains the following early history of the subdivision of vessels into watertight compartments:

We shall commence with a description of the ships employed by the Indian merchants which are built of fir timber.¹ The vessels are provided with a good helm, have four masts with as many sails, . . . have a single deck, and below this space is divided into about sixty small cabins . . . Some of the ships of the larger class, have, besides the cabins, *thirteen bulkheads or divisions of the hold*. These are formed of thick planks let into each other (i. e. mortised or rabbeted). The object of these is to provide security against accidents which may occasion the vessel to spring a leak such as striking a rock *or receiving a stroke from a whale*, a circumstance which not infrequently occurs. When sailing at night the motion through the waves causes a white foam around the bow that attracts the notice of the hungry animal. In expectation of meeting with food, it rushes violently to the spot, strikes the ship and often forces in some part of the bottom . . . The crew upon discovering the situation of the leak immediately remove the goods from the *division* affected by the water, which, in consequence of the boards being so well fitted, cannot pass from one division to another. . . . The ships are all double planked, that is they have a course of sheathing boards laid over the planking in every part. These are calked with oakum both within side and without,* and are fastened with iron nails. They are not coated with pitch . . . but the bottoms are smeared with the following

¹ As there is no fir timber in India, there is therefore good reason to conclude that the ships described were built in China. This country is accordingly the one that, as far as we know, may legitimately lay claim to having originated the idea of the watertight subdivision of vessels.

preparation. The people take quicklime and hemp, which latter they cut small, and with these when pounded together they mix oil procured from a certain tree, making the whole an unguent which retains its viscous properties more firmly and is a better material than pitch.²

This fact that the Chinese, as early as the thirteenth century, resorted to watertight subdivision of their vessels did not escape the attention of Dr. Benjamin Franklin. He mentioned it thus, in a letter written in August, 1785, to Alphonsus Le Roy then in Paris:

While on the topic of sinking of ships, one cannot help recollecting the well-known practice of the Chinese, to divide the hold of a great ship into a number of separate chambers by partitions, tight caulked, so that if a leak should spring in one of them the others are not affected by it. . . . *We have not initiated this practice.*

A little farther on in this same letter, Dr. Franklin states that there are six kinds of accidents that may occasion the loss of ships at sea: two kinds of these involve the foundering of a vessel from collision with ice or with another vessel. As a precaution against these he suggests in the following words the use of empty water casks.

And as to the water casks mentioned above, since a quantity of them must be in great *ships of war* where the number of men consume a great deal of water every day, *if it had been made a constant rule to bring them up as fast as they were emptied and to dispose of the casks in proper situations*, I am persuaded that many ships sunk in engagements or that have gone down afterwards might, with the unhappy people, have been saved.

This idea can without a great stretch of imagination be considered a forerunner of the scheme later devised in France by Mr. Emil Bertin. This was to provide cofferdams at the ships' sides filled with some kind of light packing material. At first cocoanut husk and its surrounding cellulose were used for this purpose. This was later supplanted, in the United States Navy by corn pith cellulose.

If one likens a submarine to a whale and bears in mind that the former, like the latter, is attracted to its prey by the motion of

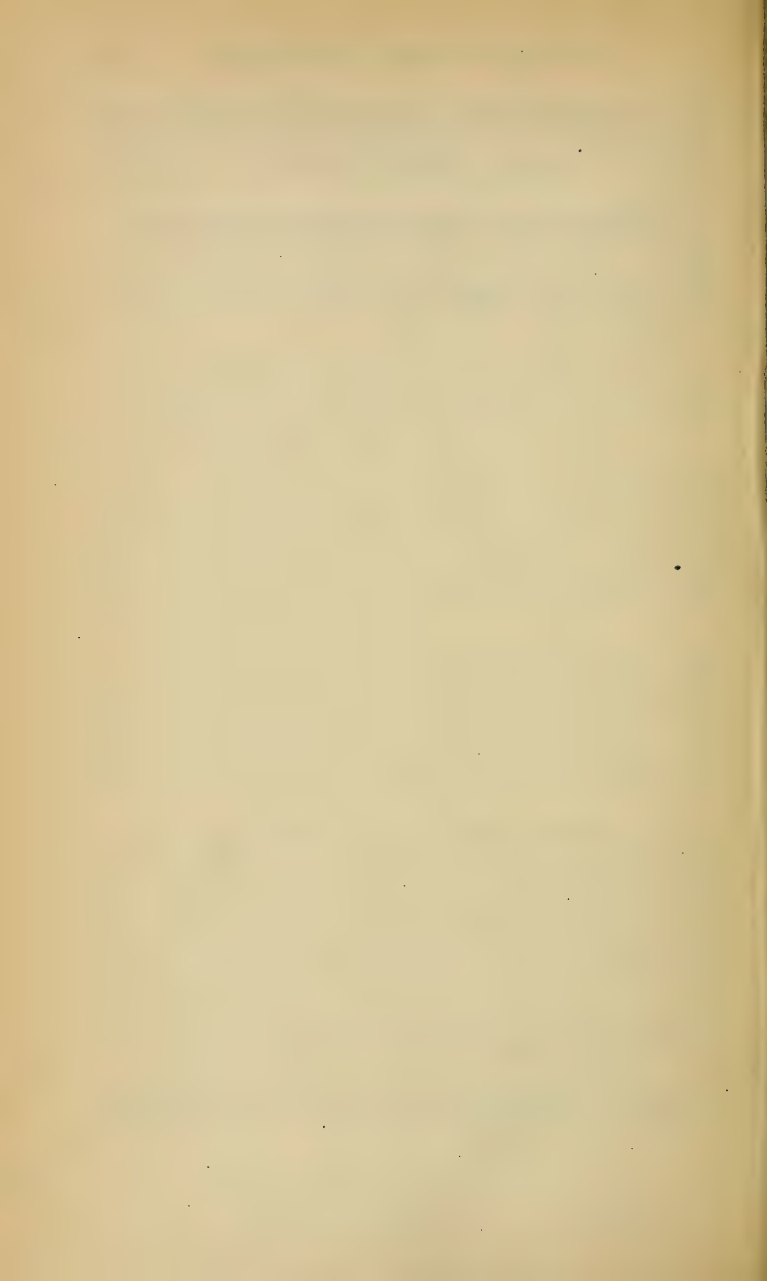
² This method of preserving the bottom of their vessels is common to the Chinese and the East Indians. It is said that the use of a coating made from a mixture of chunam or lime, with resinous oil or with melted damar, will make a vessel last one hundred years.

the vessel through the water³, and that in both cases safety against the attacks delivered by these "leviathans of the deep" is greatly increased by adequate watertight subdivisions, one may well believe

The thing that has been, it is that which shall be; and that which is done is that which shall be done; and there is no new thing under the sun.⁴

³ A submarine totally submerged is, however, attracted to its quarry through hearing and not by sight as described in the case of the whale.

⁴ Ecclesiastes 1:9.



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A YEAR IN HAITI'S CUSTOMS AND FISCAL SERVICE

BY CAPTAIN CHARLES CONARD (SC), U. S. N.

Those who pass their lives in a service such as the Navy are accustomed ordinarily to find their current work a development of preceding efforts, and thus to move forward in a steady line of progress, improving the year's output as far as possible by the experience gained in more or less similar work of the past. Occasionally, however, there comes a period of violent change, when one is plunged into an entirely new environment, and his hand is set to a work entirely outside his range of experience. He is fortunate if the new task is one which suits his temperament and habits of thought, and somewhat to be pitied if it does not. In either case, he is apt to have a somewhat strenuous time.

There follows a brief outline of a period of the nature indicated, lasting a little more than one year. No attempt will be made to furnish a complete or continuous record, but certain features which are thought to be of interest will be described.

Toward the middle of August, 1915, eleven officers of the Navy, all belonging to the Supply Corps (Or Pay Corps, as it was then called), received telegraphic orders to proceed to Philadelphia immediately and report on board the U. S. S. *Tennessee*. These orders had been transmitted in code, and were to be held as confidential. Nothing was said as to the nature of the duty to be performed, but as the press had contained news of trouble in Haiti, and as occupation of the ports of that country by the U. S. Government had been predicted, there was ground for belief that this had something to do with the matter, especially as it was known that a force of Marines had also been ordered to the *Tennessee* for transportation to Haiti.

I was one of those who had received such orders. It was known that the Customs Service of Haiti would have to be taken over, and it seemed reasonable to conclude that my orders related to that project, as previous experience along the same lines, in Vera Cruz, Mexico, had fallen to my lot.

The other ten officers concerned reached Philadelphia, and with but few exceptions each was under the impression that he had been ordered to relieve the Paymaster of the *Tennessee*, though some surprise was felt in regard to the unusual nature of the orders, especially as some were on leave at the time the orders reached them, and others felt reasonably sure that they were not due for sea duty. The matter in hand was explained to them only after they had reported aboard ship.

At that time there was a good deal of discussion of accounting in the Navy, and press representatives who inquired of the Executive Officer of the *Tennessee* why so many Paymasters had been ordered to one ship, were gravely informed that the Navy's new accounting system required that many.

There are ten seaports in Haiti having custom houses, and for this reason Admiral Caperton, commanding the naval forces in Haitian waters, had requested the Navy Department to send eleven Pay Officers, one for each port, and one to act as administrator of the whole service.

Owing to my long and varied career of about seven months of Custom's service in Vera Cruz, it was my business to instruct the others of the party in the details of the work to be undertaken. None of the others had had any experience in Customs affairs, other than in paying duties when returning from foreign service—or in finding ways for not paying them. However, during the passage down we went over the situation, as far as our somewhat meager information permitted, and settled certain fundamental lines to be followed, pending the working out of a complete scheme.

We reached Port-au-Prince, the capital and chief port of Haiti on August 31, 1915.

Prior to our arrival the ports of Cape Haitien, Port-de-Paix, Gonaives and Saint Marc had been occupied, and the custom houses placed in charge of officers attached to vessels of the Cruiser Force. As this was at a sacrifice of the efficiency of the

vessels concerned, it was desirable to relieve these officers as promptly as possible. Immediately after arrival I was appointed Administrator of Customs, relieving Paymaster Charles Morris who was acting in that capacity temporarily in addition to his duties as Pay Officer of the Flagship.

As the *Tennessee* left Port-au-Prince on the day of her arrival, bound for Cape Haitien, it was decided to send two officers by her to take charge of the Custom Houses at Cape Haitien and Port-de-Paix. Paymaster W. L. F. Simonpietri was appointed as Collector of Customs and Captain of the Port at the former, and P. A. Paymaster Smith Hempstone at the latter port, and they proceeded as indicated above. As there had been very little time for instructions to the officers, they were told to depend largely upon their initiative, and in case of doubt to submit difficulties by wireless.

Up to this time possession had not been taken of the customs house at Port-au-Prince, such action having been delayed in consideration of the effect it might have on the negotiations then being conducted by the American Chargé d'Affaires with the Haitian Government, for the conclusion of a convention covering the custom's control and financial reorganization of the Haitian Government. It was now decided by Admiral Caperton to take possession of the Port-au-Prince Customs House, as a measure to bring additional pressure to bear in connection with the treaty negotiations; also in view of the expected arrival of several merchant vessels at this port, and the desirability of collecting the duties on their cargoes; and because it was realized that the Customs administration could not be properly organized until this, the largest customs house was in our hands. Therefore, on September 2, 1915, the customs house at Port-au-Prince was taken over and put in charge of Paymaster H. E. Stevens, U. S. N., who was appointed Collector of Customs at this port. Lieutenant Commander Willis McDowell, U. S. N., was immediately thereafter appointed Captain of the Port, later turning this duty over to Paymaster Stevens.

The occupation of the Port-au-Prince Customs House was carried out without resistance on the part of the Haitians, this being also true of the custom houses previously taken over. All employees, however, with the exception of one or two, refused to

continue on duty, under instructions, it was understood, of the Minister of Finance. Consequently it was necessary to organize a new force at once, in order to proceed with the clearing of merchandise, both export and import.

A force was gradually gotten together, some of the recent employees returning, and some who had been in the Custom service in previous administrations were secured.

The Collector of Customs, as soon as the work of clearing vessels was underway, began the task of cleaning up the offices and storehouses, and this work was completed satisfactorily.

On September 4, P. A. Paymaster M. H. Philbrick was appointed Collector of Customs at Jeremie, and reported aboard the U. S. S. *Marietta* to accompany the expedition sent out to capture that place and take over the customs house. This was accomplished the succeeding day without opposition.

On September 5, P. A. Paymaster A. G. Hearne and Assistant Paymaster F. C. Bowerfind were appointed as Collectors of Customs¹ at Gonavies and St. Marc respectively, and left to relieve the officers who had been temporarily detailed at those places. All these officers, having had the advantage of observing the methods of business employed at Port-au-Prince, were in better position to take over and administer the duties at their respective ports than in the case of the two officers first sent out.

On September 6, P. A. Paymaster F. E. McMillan, and P. A. Paymaster H. R. Snyder, left for Petit Goave and Miragoane, at which places they were appointed Collectors of Customs in the order named.

On September 12, P. A. Paymaster E. H. Van Patten, and P. S. Paymaster B. D. Rogers, reported aboard the U. S. S. *Sacramento*, having been appointed Collectors of Customs at Jacmel and Les Cayes, respectively, to take office upon the acquisition by the U. S. Forces of those ports. Les Cayes was occupied on September 15, without opposition. Jacmel was occupied two days later.

In planning our system for obtaining a proper grasp of the Haitian Custom Service we proceeded on the basis that every merchant vessel must carry a manifest, on which her cargo must

¹For brevity, the title "Collector of Customs" will be held to include that of "Captain of the Port," in the following pages.

be listed, each bill of lading being separately entered. Further, each bill of lading must give a general idea of the merchandise involved, with weights and numbers of packages. In addition, for incoming cargoes, invoices from the country of origin must be produced, showing exact descriptions and values of the goods. Most countries require these invoices to be certified to by the Consular representatives abroad, the invoices then being called "Consular Invoices."

Importers and Exporters must also furnish sworn declarations relating to the goods in movement, and there are usually heavy penalties for false declarations.

Each country has published tariffs covering rates of duties on imports and (excepting the United States, for one), exports. Also there are various tonnage, harbor and health duties, according to local conditions.

So much was known before entering upon our task. We found, as had been expected, that the Customs laws of Haiti were obtainable in printed form, being embodied in a small volume entitled *Loi sur les Douanes de la République* and fluent French scholars will have no difficulty in translating this as the "Custom House Law of the Republic." This volume also contained the tariff schedules. It is true that these publications were very scarce, and no copies were found in some of the custom houses. After much trouble they were secured later and distributed to all ports.

One of the first steps taken was to radio the Navy Department, requesting immediate shipment of one dozen French-English dictionaries, and one dozen typewriters. Upon the receipt of these we felt ready to handle any emergency. •

The methods adopted for transacting Custom House business were those which the *Loi sur les Douanes de la République* provided, so far as the instructions contained therein did not conflict with the interest of the United States, or were not otherwise objectionable.

It was considered that at first no material changes of methods should be made, although where it was found that the provisions of the law above mentioned had not been strictly enforced, variations of procedure with a view to such enforcement should be made.

In this connection it was found that in the ports first taken over receipts were being paid in cash to the Collector of Customs, who daily deposited such cash in the National Bank of the Republic of Haiti. The law to which reference has been made prescribed that payments should be deposited in the National Bank by the payers, who then exhibited their receipts to the Collector of Customs for the proper clearance of goods and vessels. As this method provided a double receipt, one by the bank and one by the Collector, it had obvious advantages. Instructions were therefore issued that the legal methods should be followed throughout the service.

It was found that the business of the customs service as administered by the Haitian authorities was conducted in a manner which did not accord with the modern ideas of efficiency in many respects. Blank forms for the preparation of documents were practically non-existent, and all papers were prepared in handwriting on blank sheets. Fixed salaries of the clerical force were nominal, but fees were exacted from merchants for the preparation of clearance papers, etc. This resulted in favoritism in certain cases and made the work of receiving and shipping goods slow and cumbersome.

Printed forms for making declarations, and subsidiary papers, were supplied, and formal methods for recording and checking receipts and expenditures of cash were instituted. All fees were abolished, and salaries placed upon a reasonable basis. At each port the Collector of Customs prepared and forwarded to the Administrator of Customs a salary list, which was gone over carefully, and a uniform scale was finally adopted covering similar positions and duties in the several ports. Under instructions received from the State and Navy Departments, disbursements of customs revenues (aside from sums turned over to or expended directly for the Haitian Government), were restricted to four general purposes, as follows:

"For the organization and maintenance of an efficient constabulary.

"For conducting such temporary public works as will afford an immediate relief through employment for the starving populace and discharged soldiers.

"For the maintenance of such military and civil government as the United States may establish.

"For the expense of maintaining the customs service, including Captain of the Ports' Offices."

Through a series of laws and concessions of prior years the bulk of the custom's receipts were pledged for the payment of interest and principal on borrowings of the republic, or as guarantees for the fulfillment of contracts. It was necessary to disregard this state of affairs for the time being, in order to carry out the purposes of the military administration undertaken by the United States.

In order to meet the objections of the Haitian Government on the one hand, and of the National Bank of Haiti on the other, it was decided to administer all moneys received as a trust fund, for which purpose an account was opened in the bank entitled "Admiral Caperton Account." It was thus practicable to avoid interference with both Government and bank regulations relative to the handling of customs receipts, and to utilize the funds in the manner best fitted to meet the demands of the country during the period of re-establishment succeeding the recent revolution.

However, the National Bank, which by law was charged with the duty of segregating the items of receipt and expenditure in accordance with the liens, or "affectations" as they were called, was directed to maintain the accounts in such a way as to permit final adjustment to the satisfaction of all parties concerned. These accounts were checked regularly by the Administrator of Customs, and balanced with the records under the "Admiral Caperton Account."

The expenditures made for the account of the United States authorities were subdivided in the following manner, in order to give as clear an exposition as possible of the uses to which these funds were put. This subdivision also furnishes a general idea of the activities carried on at the time in question.

CONSTABULARY:

A—Pay of officers and men.

B—Pay—Civil—including clerks and interpreters.

C—Barracks—construction, repair, rent, etc.

D—Equipment—Uniforms, horses, saddles, typewriters, office furniture, etc., including repairs to.

E—Police—Pay and equipment of.

F—Miscellaneous—Office and other minor expenses not otherwise classified.

PUBLIC WORKS:

G—Streets and roads—Cleaning and construction of.

H—Harbor improvement—Dredging, construction and repair of wharves and docks.

I—Hydraulic work—Maintenance and construction of pipe lines, water supply, sewerage system, etc.

J—Public Institutions—Construction and repair of.

K—Miscellaneous—Office and minor expenses not otherwise classified.

MILITARY AND CIVIL GOVERNMENT:

L—Prison expenses—Clothing, rations, medicines and medical attendance of prisoners. Minor repairs to jail.

M—Relief of poor and hospital expenses. Maintenance and equipment of hospitals including rations for sick. Such donations for relief of poor as may be authorized by the Detachment Commander.

N—Sanitary—Such expenses and work as may be authorized for purely sanitary reasons not to include street cleaning.

O—Clerical force including interpreters, pay of.

P—Purchase of rifles and payment of Haitian soldiers.

Q—General expense—Office and minor expenses not otherwise classified.

CUSTOM SERVICE:

R—Clerks, watchmen, inspectors, etc.

S—Pilottage, sanitary inspections.

T—Repairs and improvements—Minor repairs to docks and custom houses including repairs to office furniture and equipment.

U—General expense—Office and other minor expenses not otherwise classified.

V—Captain of the Port.

In addition to disbursements of the character just mentioned, the Commander, Cruiser Force was directed to turn over to the Haitian Government a weekly allowance for the expenses of maintaining that Government. This was at first fixed at \$25,000 per week, and was duly paid for several weeks. It developed, however, that the sums so turned over, instead of being used for current running expenses, were diverted for the purpose of liquidating certain obligations which the officials of the Haitian Government deemed pressing. Consequently, the State Department in Washington decided to modify its instructions, and

directed that, commencing with January 1, 1916, all salaries and expenses of every nature, pertaining to the Haitian Government, should be paid directly by representatives of Admiral Caperton to the employees concerned, in all ports of the republic.

This necessitated immediate preparation and institution of a system of financial control of the affairs of the Haitian Government, and the development of methods by which funds could be placed directly in the hands of those entitled to payment. A practice of discounting pay receipts had long been prevalent in the country, and in a great number of cases it had transpired that employees at a distance from the Capital actually received but a small percentage of the amounts due them. The discounted pay receipts, or *feuilles* as they were called, passed from hand to hand, each holder realizing a portion of the face value, until final liquidation was made by the Treasury in favor of the last holder. In order to break up this practice a form of non-negotiable receipt was devised, and the individual to whom the payment was due was required to draw the amount in person.

To accomplish this, it was necessary for representatives of the Admiral to visit every town and hamlet of the republic each month, carrying the funds to be paid with them. A happy solution of the problem consisted in utilizing the services of the officers of the Gendarmerie (as the constabulary was called) who, being officers and high ranking enlisted men of the Marine Corps, detailed to the Gendarmerie, were especially well fitted to carry out their part of the task.

For all payments to be made in the principal ports, where branches of the National Bank were established, it was directed that the payees must present themselves in person, sign the receipts and obtain the money. For the payment of salaries, pay rolls were prepared each month in the Administrator of Customs' office at Port-au-Prince, from the records of the Haitian Government. Each governmental department submitted lists of the employees coming under its cognizance both in the Capital and elsewhere. The lists were gone over carefully, and all duplications, erroneous entries, etc., eliminated as far as possible. In the outlying districts the Gendarmerie officers investigated and reported upon the actual conditions of employment existing, whether or not the persons named in the pay rolls were rendering

the services specified, and if not, who were rendering them. All doubtful cases were referred to the central office, and after thorough investigation the rolls were corrected when necessary and payments made to the proper claimants.

The general method of handling funds consisted in depositing to the "Admiral Caperton Account" all receipts from customs revenues, without deducting for any expenses. At each port the receipts were paid in to the branch of the National Bank, and three times each month the Collector of Customs reported by radio or telegraphed—whichever was most practicable at the time—the amount of the collections, using the Navy Radio Code and a prescribed order of wording. Each month the branch bank reported to the parent bank in Port-au-Prince the deposits from customs, using the private bank code, the messages being transmitted by the Navy's radio whenever possible. These two independent sources of information were, after de-coding, compared. Differences were frequently found, but all were reconciled after correspondence, being usually due to various constructions of the Customs laws, particularly in regard to advance or partial payments of duties.

For all expenditures to be made, estimates were forwarded from the various ports, by telegraph or radio, followed by detailed letters of explanation. The appropriate sums were then placed to the credit of the various Collectors of Customs, in the branch banks, and disbursed upon properly authorized vouchers submitted by detachment commanders and others in charge of the work being carried on by the United States authorities. Expenditures for the account of the Haitian Government, such as salaries, etc., were controlled directly by the Administrator of Customs, acting as Fiscal Officer. The Gendarmerie officers, who acted as disbursing representatives in this case, received the pay rolls, with prepared receipts and funds, and saw to it that the money was delivered into the rightful hands. All undelivered amounts with unused receipts, were returned to Port-au-Prince, from which it will be seen that the plan for paying employees was extremely simple. The actual execution of it, however, involved much investigation and labor, including long trips into the interior to locate and pay the recipients, who had to be thoroughly identified before payment could be made. The work

was admirably done by these officers, and it is safe to say the system of discounting *feuilles* was effectually abolished.

In general, from the above, it will be noted that all Customs receipts were paid in gross to the "Admiral Caperton Account" with no deductions for expenses of any kind. Sums for necessary expenditures were then separately allotted, after estimates had been finally approved by the Commander Cruiser Force. The keeping separate of the receipt account from all expenditures, instead of taking up net balances only, is belived to have tended strongly toward efficiency and accuracy.

One of the most important reforms accomplished under the American Navy's control of Haitian finances was the stabilization of the rate of exchange between the local currency, or "gourdes," and the United States currency. The Haitian currency consisted entirely of paper and nickel, without gold backing of any kind. It circulated purely as a medium of exchange, based on the credit of the Haitian Government. The real standard of value was the United States dollar, all export duties being payable in United States currency, and a large proportion of import duties also. The rate of exchange between the two currencies was accustomed to fluctuate between two or three gourdes for a dollar, and eight or nine gourdes for a dollar, depending upon the demand for Haitian currency at various seasons of the year. Thus, ordinarily, when the coffee crop was being gathered, gourdes were paid out into the country districts, were hoarded by the country people, and became scarce. The result was that at that time an American dollar could buy only two or three gourdes. Later, the hoarded gourdes would be spent by the country people, would flow back to the ports, and the available quantity having increased, the gourdes would fall in value, so that the American dollar would buy eight or nine gourdes. This fluctuation in exchange was more or less aided and abetted by speculators, who manipulated the market to their own advantage. It was extremely bad for business, as the ordinary merchant, who based the value of his goods entirely on U. S. Currency, but who was compelled to set prices in gourdes, could never be sure what gourdes would be worth from day to day.

A study of this situation was made, and it was concluded that the fair value of a gourde was twenty cents, approximately the

same as a franc. It was decided to fix the gourde at this value, and this was accomplished in three ways:

(1) By making all payments on Government Account in gourdes or "gold" (as U. S. Currency was denominated) at the fixed ratio, using whichever currency was considered to have the best effect on the market at the time.

(2) By causing the National Bank to exchange gourdes for gold, or vice versa, upon demand, using the accumulated custom receipts (Admiral Caperton Account) for this purpose. Such accumulated funds contained both currencies, as duties were payable partly in gourdes and partly in United States currency. It was, of course, necessary to restrict this exchange (at fixed rate of five to one) to actual business demands, so as to guard against speculative attempts to break the rate.

(3) By buying or selling gourdes in the open market, depending upon the direction in which the exchange rate was tending. Thus, if gourdes showed a tendency to depreciate in value from the five to one standard, purchase was made of a sufficient amount to slightly reduce the volume of gourdes in circulation. The purchased gourdes were retained in the bank and an equivalent value of gold (U. S. Currency) was placed in circulation. If the rate varied in the other direction, the reverse process was used.

An unexpected situation seriously hampered this plan for a time, and illustrated the effect of international events on the domestic currency problems of a small country like Haiti. Inability to secure dyes from Germany caused a heavy demand for the raw materials for the manufacture of dyes in the United States. Logwood, which had hitherto been one of the minor exports from Haiti, suddenly sprang into prominence as a valuable product, and all Haiti devoted itself to hauling logwood to the ports, where it was eagerly bought up at greatly advanced prices by every speculator who could get hold of any funds for the purpose. Great piles of logwood lay in every port, awaiting transportation to the United States. Incidentally, many of the speculators lost heavily on the transaction, because it was impossible to get space on the few available vessels. Also, freight rates went up remarkably, cutting out the estimated profits of the exporters.

This occurred just before the commencement of the coffee harvest, when merchants were accumulating gourde currency slowly, in anticipation of coffee purchases in the interior. The gourdes had been slowly rising and had almost reached the value of twenty cents (five to one), at which value the plan of stabilization was to be put into effect. Suddenly the exchange rate rose sharply, slightly passing the rate fixed in the plan. Instead, therefore, of letting the rate come slowly to the desired point, and holding it there, it now became necessary to force it back to the point it had passed.

All salaries and government expenditures were immediately ordered to be paid in U. S. Currency at one dollar for five gourdes. This caused bitter complaint, for, where two weeks previously settlements of all kinds were requested in "gold" rather than in gourdes, now, with a slightly enhanced value of the gourde, "gold" was scorned. At the same time, all merchants, contractors, etc., who had payments to make to laborers and country people were allowed to exchange their United States Currency for gourdes, at the bank, at the fixed ratio of five to one. This was because laborers and ignorant country people were not accustomed to American money and would not take it. This permission had to be very closely watched, and all but bona fide requests refused. Also, purchases were made from time to time of United States Currency, using gourdes in exchange, a few points off the market rate.

These steps were possible because there was always a steady inflow into the "Admiral Caperton Account" of both gourdes and "gold." Export duties were by law payable in United States Currency. Import duties had to be paid partly in gourdes and partly in United States Currency, that is, a flat duty in gourdes and a surtax in gold. Consequently, exchange operations of the character described could be carried out indefinitely.

The rate was soon forced back to the five to one ratio and maintained there during the rest of our stay in Haiti. I am informed that it has not varied much in the years since, and I am confident that if it had been properly supervised, it would not have varied at all.

There were several amusing features in connection with this struggle. In the first place, it must be realized that it was far

from the interests of the exchange speculators to have a fixed rate of exchange established as it practically deprived them of their business. During the preliminary discussion of the plan before the Board of Trade there were several near riots, so warm did the arguments become. There was a pretty general opinion held that it was economically unsound to attempt to influence exchange rates by governmental control, and that natural laws of trade ought to have full sway. Quotations from the best French economists were used with great effect, and the Administrator of Customs was shown to be ignorant of financial laws and trying to accomplish the impossible. But this was a case where the usual arguments could not be held to apply, because we were dealing with an absolutely fixed quantity of Haitian paper money circulating side by side with United States Currency, which varied in quantity with trade demands, and which was itself the actual legal medium of exchange and standard. Anyway, the exchange rate was stabilized and remained so.

Perhaps the most touching argument was used by the Minister of Finance. He said that his friends had always been accustomed to see the exchange rate fluctuate up and down, they counted on it, and that it would be an economic crime to interfere with it and ruin their business.

Shortly after our arrival in Haiti we learned that the previous Government in power had contracted for the printing of two or three million gourdes, to be added to the existing stock. The United States authorities did not wish this additional paper money to go into circulation, because a contract existed between the Haitian Government and the Haitian National Bank which provided for a new currency plan under which the bank was to issue notes, and all Government notes were to be retired. Owing to revolutions and disagreements with the bank, this plan had never been put into effect. Pending settlements of disputes and rehabilitation of the country it was evident that the Haitian Government should not issue any more paper currency, as the effect would be to simply depreciate the value of the currency in circulation. It was, however, a convenient way for the Government to put itself in funds at that time, and, as we know,

is a plan which many supposedly more enlightened governments have availed themselves of pretty freely in the recent past.

However, a shipment from the United States of a half million gourdes was reported to have been made, and we were directed to seize this shipment and hold it. The vessel on which the notes were suspected to be, reached Port-au-Prince and the Collector of Customs (Stevens), met her before she got into the harbor. He asked the captain if he had the notes, and the captain sent for the manifest to find out. Reading of the manifest failed to disclose any such item. It looked as though a mistake had been made. However, on reading over the manifest again, Stevens noted an item calling for ten boxes of stationery, and further inquiry developed the fact that this "stationery" was stowed in the ship's strong room. So the first cargo taken out of the ship was the ten boxes, which of course contained the half million gourdes, in one and two gourde notes. They were stored in the Custom House, and while they were never signed up—they were supposed to be signed individually by the Haitian officials before becoming money—they had their use later, in the following way:

At the time when the struggle to maintain the currency was most acute, and the value of the gourde was tending to appreciate unduly, on account of the scarcity of notes for circulation, that is, during the logwood speculation, the question was often discussed as to what the effect would be if these seized notes could be utilized. With a total circulation of about 7,000,000 gourdes in the country, the sudden addition of 500,000 would undoubtedly have had a marked effect on the exchange rate. However, under the circumstances, there was no legal way to do this. But the fear that it might be done caused considerable hesitation on the part of those interested in speculations on the value of the gourde. Here it should be explained that exchange quotations were always made by indicating the number of gourdes necessary to make a dollar. So, as gourdes rose in value, the exchange rate dropped. It had receded from five to four ninety and down to four eighty. Desperate measures were necessary. Accordingly, word was sent to the Custom House to break out the ten boxes and deliver them to the bank. As much noise was made about this as possible. Each box was handled by as

many laborers as could get around it and a guard of marines accompanied the procession which stretched out considerably and took the longest convenient way to the bank. So that by the time the boxes were finally deposited in the bank's vaults pretty nearly everybody in Port-au-Prince knew what was going on.

It was immediately assumed that the notes were going to be signed and issued, and the belief caused the exchange rate to jump back to four dollars and ninety cents that same day, from whence it was gently but firmly led to its resting place of five to one in the few days following.

The plan adopted succeeded completely, and it was not long before the population became accustomed to the fixed rate and learned to count upon it as permanent matter. There were many efforts made, at first, to upset the fixed rate, as those who had made a practice of dealing in local exchange found their business ruined. Many objections were raised by employees to receiving their pay in U. S. Currency, at the time when they had counted on gourdes going to a premium, but a firm stand was maintained in this regard and eventually opposition ceased.

The public debt of Haiti was a matter of great interest and I devoted much study to it while stationed in that country, and immediately after my return to the United States, when I was assigned to duty in the State Department for a few months.

The debt was divided into three classes, as follows:

External Debt, about \$20,000,000; market value.....	\$16,000,000
Internal Debt, about \$2,250,000; market value.....	1,625,000
Floating Debt, guarantees of interest, etc.....	2,250,000

All of these debts, or rather the bonds, mortgages and agreements, were secured by liens on the customs revenues, in various forms. Such liens were called "affectations," and consisted in the setting aside, or ear-marking, of duties arising from the import or export of specified commodities. For example, the export duty on coffee, which was \$3.00 per hundred pounds, was allocated as follows:

External Loan of 1875.....	\$.33 1/3
External Loan of 1896.....	1.20
External Loan of 1910.....	1.00
Interior Loan of August 14 1914.....	.05
Contract for Street Repair, Port-au-Prince.....	.03

Subvention, French Cable Co.....	.05
Irrigation of Plaine des Cayes.....	.10
Market and repair of Streets des Cayes.....	.05
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Total of Affectations.....	\$2.81 1/3

Thus, of the \$3.00 collected on each 100 pounds of coffee exported, there was only eighteen and two-thirds cents available for the ordinary expenses of the Haitian Government.

This affectation system was a serious bar to any proposed readjustment of the Haitian tariff, since the fact that revenues from certain duties were pledged for specific debts made it practically impossible to readjust the tariff in any way whatever. For this reason, and also because it was evident that the face value of the outstanding debts could be reduced, with consequent lowering of interest charges, it was considered highly desirable to refund all obligations of the Government, and to substitute a guarantee based solely on the rehabilitated credit of Haiti, in place of the complicated affectation method.

The foreign debt, which constituted the bulk of the country's obligations, was made up of three bond issues, all of which had been issued under French supervision. They stood (in 1915) as follows:

Loan of 1875—Outstanding	Fcs. 19,252,560
Loan of 1896—Outstanding	Fcs. 37,638,500
Loan of 1910—Outstanding	Fcs. 64,021,000
<hr/>	
Total	Fcs. 120,912,060

At the normal rate of exchange these bonds would have a value of \$23,336.27, but exchange was not normal, francs at that time being quoted at around six to one. Consequently, the exchange valuation of this sum was approximately \$20,000,000. But the Haitian bonds were quoted on the Paris-Bourse at something like eighty per cent which, by taking both exchange and market values into consideration, gave a net value to these bonds of approximately \$16,000,000.

At this time (end of 1916) the French Government was using every effort to obtain loans in the United States, and was offering as collateral every form of security which could be gathered in. Some of these very Haitian bonds had been pre-

sented for examination in this connection, but had not been considered sufficiently gilt-edged for acceptance. It was thought possible to take advantage of the exceptional circumstances then existing, to the mutual advantage of the French and Haitian governments, and this was the plan developed:

As the Haitian bonds were almost entirely owned by French citizens, it was proposed that the French government should take over the entire liability for the Haitian bonds outstanding, issuing French bonds to be exchanged for the Haitian bonds as presented from time to time. As compensation for doing this the French government was to receive approximately \$16,000,000 from the Haitian government (depending upon the valuation to be fixed, in conference, of the outstanding Haitian bonds). A new consolidated bond issue for Haiti was to be financed by an American bank or syndicate, for the following purposes:

To redeem existing external debt.....	\$16,000,000
To redeem existing internal debt.....	1,750,000
To redeem existing floating debt.....	2,250,000
To pay back interest due.....	1,500,000
Miscellaneous public works, promotion charges, etc....	8,500,000
Total	<u>\$30,000,000</u>

It was planned that the new loan should be for a term of thirty years, at six per cent, and should include proper provision for amortization. It was figured that the bonds would be taken by the syndicate at about ninety-six per cent and offered to the public at about ninety-eight per cent. This would give the Bankers a possible profit of \$600,000, which, considering the expenses of flotation and the risks involved, was thought not to be excessive, and certainly not unusual.

To carry this plan into effect it would of course be necessary for the United States Government to furnish some form of guarantee that the Haitian Government would carry out its obligations as to payment of interest and principal of the consolidated debt, otherwise the capital would not be forthcoming. It was thought that this might well be arranged for in the shape of a written agreement between the two governments to the effect that in consideration of the good offices of the United States in obtaining the proposed loan of thirty million

dollars, it would be understood and agreed that the United States would intervene in case of failure on the part of Haiti to pay either interest or principal when due. This agreement was intended to be much the same thing as the Platt amendment in the case of Cuba.

This matter was laid before the French Government, after conference with its representatives in this country, and the French Government indicated its willingness to carry out its part of the plan, which would result in the obtaining of about \$16,000,000 for that government under obligations issued almost entirely to its own citizens. The floating of the new loan was looked upon favorably by New York and Chicago bankers, provided the backing of our own government was assured. The treaty between Haiti and the United States, which had now been signed, provided for supervision over Haitian affairs by our government for a period of ten years with a possible extension to twenty years, and included Articles relating to aid to be given by the United States in matters of reorganization and financing. The additional agreement, mentioned above, seemed to be in accord with the spirit of the treaty, and it was believed that it could be entered into without formal amendment of the treaty itself. It was thought, further, that the understanding that the United States would continue to maintain an interest in Haitian financial affairs throughout the life of this loan would be a great help in attracting capital to Haiti, and would be in every way beneficial to that country.

The plan was laid before the President by the Secretary of State, and the President approved it, stating, however, that he would like to have the opinion of the chairman of the Senate Foreign Affairs Committee as to the necessity of amending the Haitian treaty in order to carry the plan into effect. The chairman, after considering the matter, expressed the opinion that the treaty should be amended. This was hardly practicable at that time, and although the matter was placed in modified form in several successive attempts, no success was ever achieved in putting through a loan with consequent refinancing of Haiti. As far as I am informed, the situation has remained practically unchanged up to the present time.

This was a great disappointment to me, as I had become very enthusiastic in developing this plan, and regarded it as being in every way for the advantage of Haiti, in whose people and their prosperity I had become exceedingly interested. I still believe that the matter should have been carried through as proposed, in which case conditions in Haiti would now be much better than they actually are.

To go back a little, my term of service in Haiti ended in September, 1916, a General Receiver of Customs having been appointed to take over the customs service, and a Financial Adviser to take over the fiscal matters, as provided in the treaty. I turned over both offices with considerable regret, even though it meant getting back to home and family. The work itself was so interesting that I disliked giving it up.

The other officers who had come down for this service had been withdrawn some time previously, and their places had been taken by Naval Pay Clerks, who did excellent work in various ports. They remained for several months thereafter, until competent substitutes could be obtained from the United States.

There were many more matters of interest which could be described, in connection with this year's duty, but to do so would be to unduly lengthen this paper. It has been considered wiser, therefore, to confine it to the features already briefly touched upon.

NOTE: This article was written late in 1921. Since then a Haitian loan of \$30,000,000 has been effected and the bonds are now being marketed.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A TRIPOLITAN WAR RECORD

Letter dated November 12, 1804, written by Midshipman Robert T. Spence, U. S. N.; with introductory note by Professor Allan Westcott, U. S. Naval Academy.

The highly interesting personal letter which follows, narrating events in the war between the United States and Tripoli, was found recently among family papers by descendants of the author, Midshipman (later Captain) Robert Traill Spence, U. S. N. Spence was commissioned midshipman in 1800, and was one of Commodore Preble's "schoolboys" in the Mediterranean Squadron during the lively campaign of 1804. His father, Keith Spence, was a Portsmouth (N. H.) merchant who had been purser in the captured U. S. S. *Philadelphia*, and was at this time a prisoner of the Bashaw.

The younger Spence's gallantry in the second gunboat action off Tripoli, August 7, 1804, won him his promotion, as stated in his letter, and has come down in history. He was in Gunboat No. 8, (one of those captured four days before), which blew up with the loss of her commander, Lieutenant Caldwell, and fifteen others out of a total complement of twenty-four. Fenimore Cooper, describing the affair in his *Naval History of the United States* says: "When the smoke cleared away all the after part of the boat was under water, while Mr. Robert T. Spence, of the *Siren*, and eleven men were forward, loading the long 26-pounder that formed her armament. This gun was loaded, and fired, and its gallant crew gave three cheers, as their vessel sank beneath them. Mr. Spence, who could not swim, saved himself by an oar. . . ."¹

¹ Vol. II, p. 51. Cooper agrees with the letter as to number of casualties, but gives the complement as twenty-eight. The eleven men he mentions were presumably the original guncrew, and not all there after the explosion.

From a historical standpoint, the letter has an interest also in that it throws some light on the mystery as to the exact circumstances attending the loss of the famous *Intrepid*, which Spence here speaks of as an "Infernal," sent into the harbor of Tripoli on September 4, 1804, under Lieutenant Richard Somers. The vessel blew up with the loss of all on board. Commodore Preble, in reporting the results of the disaster, says in part: "One of the enemy's largest gunboats was missing, and three others were seen very much shattered and damaged, which the enemy were hauling on shore. From these circumstances, I am led to believe that the boats were detached from the enemy's flotilla to intercept the ketch, without suspecting her to be a fireship. The boat afterward missing suddenly boarded her. The gallant Somers and the heroes of his party, observing the other three boats surrounding them, and no prospect of escape from them . . . put a match to the train leading directly to the magazine, which at once blew the whole into the air, and terminated their existence." Evidently this report, which was written soon after the affair, was not based on any information from the shore.

Cooper in his history states that it was the general belief in the squadron that the *Intrepid* was boarded; but he himself inclines rather to the opinion that the explosion was accidental and not due to an actual attack. In proof he calls attention to the report of only thirteen bodies recovered, and to the entry in the diary of Captain Bainbridge (then a captive), "Was informed that the explosion that we heard last night . . . did no damage whatever to the Tripolitans."

Spence's story, it will be seen, is much more definite. He says the *Intrepid* was "within the rocks and only one-half mile distant from the Bashaws Castle," that she was "boarded by two Gunboats, fifty men each," and that "she went up, sending 100 Turks and fifteen Christian souls to eternity." His estimate of the Turks killed is no doubt based on his knowledge of the customary crews of the Turkish boats. His account differs in other details from Preble's, the latter giving the complement of the *Intrepid*

In this and other details, the letter would seem the best authority. According to Cooper, the gunner who assisted Spence was made a commissioned officer.

as only thirteen, and her load of explosives as only "about 100 barrels of gunpowder and 150 fixed shells."

Although he speaks of "information from Tripoli," Spence's version may reflect merely the common belief in the fleet. It is noteworthy, however, that he is corroborated by the American ex-Consul at Tunis, William Eaton, who "a few months later met a Turk in Egypt who had been in Tripoli at the time of the explosion, and who affirmed that the *Intrepid* blew up 'after having been boarded by two row galleys.'"²

Of Spence's later career in the service, it may be noted that he rose to the rank of captain in 1812; was highly commended by Commodore Rogers for his promptness and ingenuity in laying obstacles in the way of the British Fleet off Baltimore in September, 1814; was active against piracy in 1822 as senior naval officer in the West Indies; and built the first fort at Mesurado, in Liberia. He married Mary Carroll, daughter of Nicholas Carroll of Maryland, and died at his home near Baltimore, September 26, 1826.³

The letter which follows is addressed to "Mrs. Keith Spence, Portsmouth, New Hampshire." As printed it preserves the original punctuation, capitalization, and spelling.

Gibraltar, November 12, 1804

Dear Honoured and Respected Mother:

I wrote you from Malta, on the 6th ultimo, mentioning the late change thats taken place in my situation; and advis'd you of our intention to leave that place for a few days. On our arrival we found the *Essex* Frigate which ship I intend joining. Capt Stephen Decatur is to succeed Capt Barron, in the Command of her. This Capt Decatur is a friend of my Father's no doubt you have heard of him by fame; he Commanded the expedition in burning the Philadelphia & for which he was promoted to a post Captain although greatly out of his turn—He since has done an action, which by far exceeds the brilliancy

² Quoted from Eaton's papers in Prentis's *Life of the Late General William Eaton* (see Allen, *Our Navy and the Barbary Corsairs*, Vol. II, p. 210).

³ Biographical details from Howard, *Genealogy of the Cutts Family*. 1892.

of that; it perhaps for intrepidity & Courage equals any thing ever done; In the Action of the 3 of August he entered with his division of Gun Boats (which was only 3) the Harbour of Tripoli under the fire of 60 pieces of heavy Cannon from the Batteries & 20 pieces from their Gun Boats—boarded, himself, & brought out 2, Mounting each superior forces & carrying a greater number of men. A Circumstance were you present to see it done you could hardly conceive it credible. In this affair he lost his brothers Lieut James Decatur, who Commanded a boat of his brothers division he was shot through the head with a Dundebuss in the Act of boarding a boat—One boat more was brought out by a Lieut Tripp who received 11 dangerous wounds in boarding (he's recovered of them). The Capt of this boat died in the most Heroic Manner. Although cut all to pieces by the Assailants swords he continued to fight; Lieut Tripp, who encounter'd him, was almost falling with weakness from the loss of Blood; when one of his sailors run him through with a Boarding Pike. He died brandishing his Sword & exhorting his men to revenge the death of their Commander. The Contest was long, 20 Turks lay weltering in their Gore, before they surrendered to the Americans. Out of 170 men, which man'd the Boats, 50 only were captured alive. The day following we brought too a French privateer & sent her in with 25 woounded Turks; they were past recovery. The next Action, the Boat I was in, Commanded by Lieut Caldwell, was Blown up. The Lieut, with a midshipman and 14 men, out 24, were kill'd. I, astonishing to relate, & 6 men escaped. 4 of the men in so wounded a condition that their lives, at first, were despair'd of. It was my Conduct on this occasion that got me my Promotion. I, at the time the shot struck, was forward, taking sight at the Gun; though not a minute before I had been aft, assisting in binding up the woounded. It being a red hot shot, she instantly exploded; I went up some distance in the air, & lighted by the Gun again; the only part remaining was that on which the Gun stood. I found by my side, one man only. Around me lay arms, legs, & trunks of Bodies, in the most mutilated state; though a little confused & bewilder'd by things tumbling on my head, & by the prospect of death before me; for I cannot swim, I had presence of mind sufficient to know my duty, & not to quitt while there was a part remaining. I fired

the Gun, & loaded her again. When she went down from under me I gave a cheer and went down—came up again; when I was taken up by one of the other Gun Boats—I cannot describe my sensations, on this melancholy Occassion—I felt as though I wish'd to die, because I should die Nobly—This accident will distress my Father much, as Mr. Caldwell he look'd on as a Son, & loved him equally as well as he does me; in fact I never knew so pure, and so strong a friendship to subsist between any two men. He certainly was the most honourable little fellow I ever knew, & the most respected of any young man in the Navy—My Father in a letter from Washington to me says thus, "Remember me to my oldest of all Modern Friends Mr. Caldwell." You may judge from this language how fond he was of him. Young Dorsey was a man of great Merit & highly esteem'd by me. I saw Mr. C. after he came down, without arms, or legs; his face so mutilated that I could not discriminate a feature—by his dress only, I recognized him; he was not dead although he sank instantly—I made another escape as astonishing as this. I made application, as well as Capt Stew't for me, to go in to the Harbour of Tripoli, in an Infernal, containing 150 Barrels of Powder & 300 shells, for the purpose of blowing the Bashaws Castle up; this expedition was Commanded by Capt Sumers—I received no direct answer, from the Commodore, & of course, expected to go; but a favorite of the Commodores, persuaded him, to allow *him* to go. Capt Decatur then made Application for me; But the Commodore reply'd he had already selected the officer, that was to go with Capt Sumers; the Night came—She went in, all were anxious with expectation when Cannon announced her near approach to the Castle. Cannon were fired from all parts of the town. In a few moments she went up—How awfully Grand! Every thing wrapp'd in Dead silence, made the explosion loud, and terrible, the fuses of the shells, burning in the air, shone like so many planets, a vast stream of fire, which appear'd ascending to heaven portrayed the Walls to our view—20 minutes elapsed, without seeing the signal agreed on, between Capt S & the Commodore. Guns were fir'd from the Commodores ship; signals repeated by the different vessels—our small schooners sent to reconnoiter the Harbour—but no Boat appear'd. Poor Sumers a Lieut & a midshipman were gone, no more to

return! We conjectured the explosion to have been premature; it has since been confirm'd by information from Tripoli. He was within the Rocks, & only 1/2 mile distant from the Bashaws Castle, when he was boarded by two Gun Boats, 50 men each,—He might have escap'd; but he started with a determination never to let so seasonable a supply fall into their Hands; & never to return alive unless he had, satisfactorily, executed his mission. He touched fire himself to match & she went up, sending 100 Turks and 15 Christians souls to eternity. What a Noble Death, & truly characteristic of that Noble Summers. He certainly was an extraordinary man. He united every thing that made the man, or the officer—possessing more firmness & determination than any man I ever saw—sought danger in every shape—dangerous undertakings were the most pleasing ones to him. In losing him we were deprived of one of the Navys most valuable officers. The Lieut with him was a schoolmate of William's his name was Wadsworth, of Portland.

Much will be done the ensuing Summer. Our force will be formidable. I shall expect the command of a Gun Boat. I hope an opportunity may offer that I may do something conspicuous. It's impossible to conceive that spirit of emulation which prevails among officers & men; danger is sought for, & the most daring intrepidity has been discover'd, in officers. Commodore P. has been succeeded by Commodore Barron, a senior officer; But in the most delicate manner. The letters from the President, to him, are of the most flattering kind, pointing out the necessity of this Act. He returns to America soon, to receive the grateful applause of his Countrymen. He certainly deserves *all* the Honours they can pay him, & more too. His conduct in Bombarding Tripoli with so *pitifull* force has astonished all Europe.

Your affec son,

R. T. SPENCE.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE SALVAGE OF THE U. S. S. "ALLEGHENY"

BY LIEUTENANT RALPH DAVISON, U. S. NAVY

AND

LIEUTENANT DONALD ROYCE (CC), U. S. NAVY

The sinkings of ships, and their salvage, are always attended by circumstances of great interest. The U. S. S. *Allegheny*, station tug at the Naval Air Station, Pensacola, was sunk and salvaged under unique circumstances which fully bear out this rule.

The *Allegheny* was built by the American Shipbuilding Company of Buffalo, N. Y., at a cost of \$430,921, and was completed November 15, 1917. She is a seagoing tug of the following characteristics: displacement, 1,000 tons; length over-all, 155 feet; breadth, 30 feet; mean draft, 15 feet.

During the morning of July 5, 1922, while assisting in docking the U. S. S. *Orion* at the Naval Air Station, Pensacola, the *Allegheny* was struck on the starboard side by the *Orion's* port propeller; a hole, twenty-eight inches long and four inches wide, was torn in the shell plating of the *Allegheny*, just abreast the starboard boiler, at the turn of the bilge; and the fireroom started to flood. The commanding officer immediately attempted to beach his ship, and momentarily it appeared that the main circulating pump, drawing from the bilges, would keep the ship free of water until she could be grounded in shallow water. The water in the fireroom, however, rose so rapidly that it became necessary to shut off the fuel; the steam pressure dropped, the pump stopped, and the vessel, with fire and engine rooms completely flooded, sank in water whose mean depth was twenty-four feet. In this position, she has a list to starboard of twenty-nine degrees.

The *Allegheny*, from calculation, would have remained afloat, even with a completely flooded fireroom, provided the remaining spaces could have been kept free from water. But this was not possible, for the after fireroom bulkhead proved to be decidedly non-water-tight, due primarily to an eighteen inch circular opening, which had been cut in the bulkhead near the forced draft blower suction to provide fireroom ventilation (closed-ashpit system of forced draft). In addition, there were openings about the main steam line, the blower duct to the fireroom, and in the structure itself.

Plans were immediately made for salvaging the vessel. It was first planned to place a patch over the opening, but examination by a diver revealed that the vessel was grounded so as to obstruct at least a third of the hole. The opening could not be closed from the inside due to its location abreast the boiler, access to which space was prevented by web frames, boiler saddles and longitudinals.

It was therefore decided to isolate the engine room, and pump it free of water, with the expectation that the vessel would then float. In her grounded position, the forward compartments of the *Allegheny* were not flooded.

Seaplane Wrecking Derrick No. 1 was placed along the port side of the *Allegheny*, and the following pumping equipment was assembled on its deck; one twelve-inch 2,500 gallons per minute centrifugal pump, electrically driven; two four-inch 300 gallon per minute centrifugal pumps, electrically driven, and in the station fire-boat, one three-inch 200 gallons per minute centrifugal pump, gasoline driven.

To prevent the vessel from sliding stern-first into deeper water, her bower anchors were carried out and dropped well forward; while to prevent her further listing to starboard as she floated, preventers were rigged from both her masts to the dock.

Divers succeeded after forty-eight hours in closing, by means of a wooden patch, the eighteen-inch ventilating opening referred to above. They worked under the greatest difficulties in the confined spaces of the engine room, and only the utmost ingenuity and perseverance enabled them finally to succeed. The opening around the main steam line was plugged with wooden wedges, and the blower duct from the fireroom was blocked with kapok

mattresses and pillows, introduced through a manhole in the duct on the fireroom side.

Pumping was started on July 8, three days after the accident, but due to structural leaks, and openings previously unaccounted for, no headway could be made. Several other attempts were made, with no success, and it was not until 4:00 P. M., July 9, that definite results were accomplished. On the morning of that day, a two-inch steam line had been run from the *Orion*, which was berthed just across the dock, and connection made to the auxiliary steam line of the *Allegheny*; the purpose of this was to use the tug's main circulating pump in freeing the vessel of water. This is a reciprocating pump of large capacity, with a thirteen-inch suction already open in the lowest part of the engine room; it was later to prove of the greatest importance in the salvage of the vessel.

Pumping was again begun, the water lowering rapidly at first, but then more slowly as the head on the numerous leaks grew greater. Fifteen to twenty men were constantly at work in the engine room, plugging the minor leaks in the bulkhead as they were uncovered. Progress was very slow, and after thirteen hours (at 5:00 A. M., July 10) the level of the water remained constant. At this time, the ship's circulating pump, upon which steam pressure had been maintained since 2 A. M., finally freed itself of water, and began to pump vigorously; its discharge was above water, and a full ten-inch stream was thrown six feet clear of the side. This additional pumping capacity was so much "net," and results were soon achieved.

At 6:30 A. M., the vessel floated, but she was still listed at her former angle of inclination, some twenty-nine degrees, and great fear was entertained for her safety. Pumping was continued, and the vessel started slowly toward the upright, when a casualty occurred which set at naught all the preceding labor. There had been a shortage of flexible steam hose on the station, and in making up the line from the *Orion*, only twenty-five feet was made flexible. The tug, as she righted, bore heavily against the rigid portion, with the result that it collapsed upon itself, and carried away at the junction of the horizontal section with the down-comer on the *Orion's* side. The pipe, carrying 180 pounds of steam, revolved about its connection on the *Orion* with

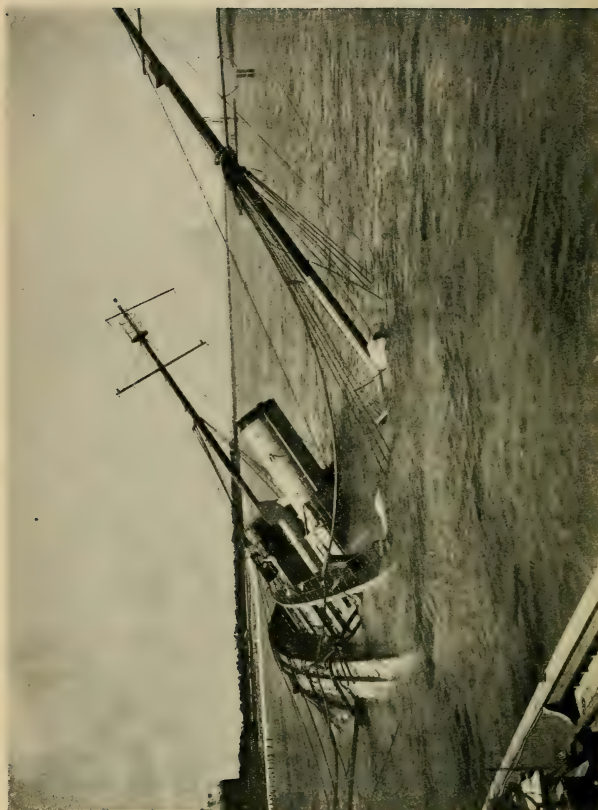


FIG. 1.—“ALLEGHENY” AFTER FIRST ATTEMPT AT SALVAGE

great velocity, resembling a giant pin-wheel in its action, and it is little short of miraculous that of the crowd of men engaged in the salvage operation not one sustained even minor injuries from the escaping steam and flying pipe.

The loss of the ship's pump was in itself serious, but the hand of Fate seemed against the whole proceeding, for the escaping steam melted the insulation of the electric leads to the twelve-inch pump, causing a partial ground, and a great reduction in the pump's speed. The loss of these two mainstays proved fatal, for the ship began to fill rapidly, and to settle deeper and deeper. A desperate attempt was made to tow her, with the seaplane wrecking derrick, into shallow water, but she was sinking too rapidly, and before shallow water could be reached, she sank, and listed heavily to starboard in so doing. Thus, at 7:00 A. M., July 10, after one hundred fifteen hours of continuous work, the poor old *Allegheny* was again *hors de combat*, resting on her starboard side, in about twenty-six feet of water, and this time listed forty-nine degrees. Her new position (See Fig. 1) was decidedly more unfavorable to salvage than her old, and a heavy air of gloom settled on the personnel that had struggled so persistently to get her afloat.

Before further efforts were made, it was considered best to make a careful survey of the situation, to review the past, to devise new ways and means, and to determine on future procedure. To this end, a board was appointed by the Commandant. The board recommended as follows: (a) That additional equipment, consisting of two submersible pumps, 150 feet of six-inch suction hose, and 200 feet of flexible steam hose, be obtained; (b) that the services of an expert civilian diver be secured; (c) that additional steps be taken to prevent the vessel from crabbing and from turning over; (d) that the former method of salvage, by pumping, be again employed, and (e) that although the operation would interfere with the mission of the Air Station, it could be done by the Air Station with the least final cost to the government, and it was accordingly recommended that the Air Station again attempt the salvage with its own personnel and equipment supplemented by that recommended.

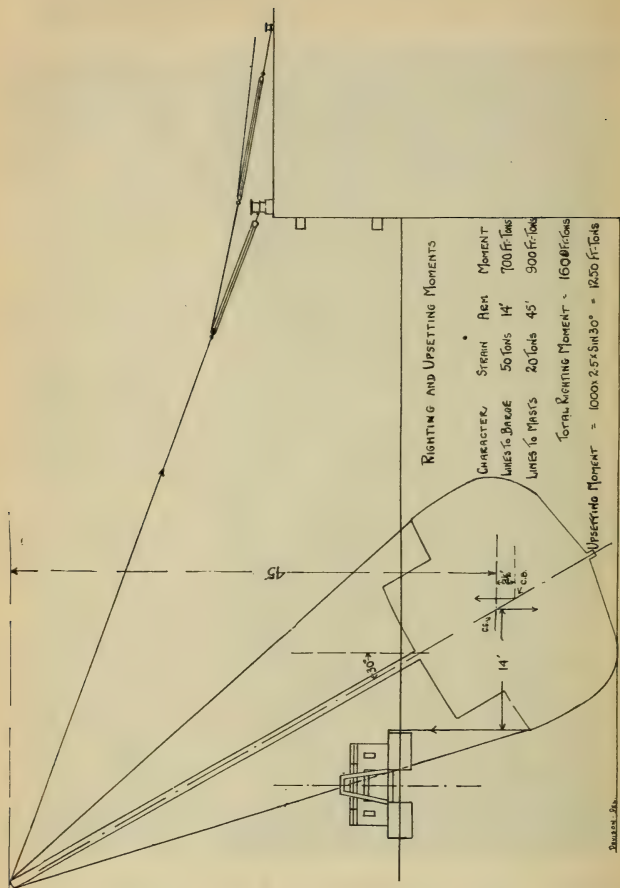


FIG. 2.—DIAGRAM SHOWING FORCES ACTING

The recommendations of the board were approved, and steps were taken to put them into effect at once. Operations were resumed on July 11. Investigation of the condition of the vessel revealed that she was near an unstable position, with a possibility of rolling toward the upright, or of turning turtle. Her normal angle of repose, resting on the bilge and the bar keel, is only eighteen degrees on a flat hard bottom. However, an unknown resistance would be offered by the sand and mud which had accumulated under her keel, but it was decided to attempt to right the vessel in order to float her at an angle more nearly normal, as well as to facilitate salvage operations, (see Fig. 2.) Accordingly, two five-eighths inch wire hawsers were made fast at each masthead, carried to the dock, and fitted with luff-on-luff tackles. By this means, a strain calculated at ten tons was put upon each mast, and the vessel was rolled to an angle of twenty-nine degrees. At this point it became apparent that the ship was being pulled in sidewise toward the dock and deeper water, and as the angle was then favorable enough, the attempt was discontinued, and she was secured as she stood. Her position after this careening is shown in Fig. 3.

To prevent the vessel's capsizing on breaking ground (it was predicted that she would be unstable at this moment), Seaplane Wrecking Derrick No. 2 was placed along the *Allegheny's* starboard side, and filled with about forty tons of water. Hawsers were rove around the *Allegheny's* bow and quarter bitts, and made fast to the wrecking derrick, which was then pumped out, placing an initial strain on these cables. It was estimated that at the time of floating the free water surface of fore hold and engine room would wipe out any water plane derived from the hull's structure and the small amount of deck house above water. The center of gravity in this position was estimated at about two and one-half feet above the center of buoyancy. Thus there would be an upsetting moment of $1,000 \times 2.5 \times \sin 30^\circ = 1,250$ ft. tons. The means of neutralizing this were provided as shown on sketch. To prevent crabbing, an anchor was carried out and planted abreast the stern on the starboard side, with the hawser made fast around the propeller shaft, while the vessel's own bower anchor was similarly planted abreast the bow.

The salvage material ordered July 12 from the Navy Depart-



FIG. 3.—U. S. S. "ALLEGHENY" SALVAGE OPERATIONS
(See Page 637)

ment, arrived from the New York and Norfolk Navy Yards on July 16. The submersible pumps were found to be too large to lower into the ship, so one was therefore set up with the other pumps on Derrick No. 1, while the other was slung from the *Allegheny's* forward boom in a position which gave it a short and efficient suction line to the fore hold, which had filled at the second sinking. The flexible steam hose was used to provide a connection between the yard locomotive and the ship's auxiliary steam line. The diver was engaged from July 13 in closing openings in the deckhouse and bulkheads of the engine room, not previously submerged. A cofferdam was constructed on the forward engine room skylight, and all pump suction to the engine room were led through this opening. A hole was burned in the forecandle companion way to provide access for the forward pump suction.

Preparations were completed July 21, and pumping began at 2:00 P. M. that day. An half-hour's pumping was found sufficient to free the fore hold of water, and all attention was thereafter devoted to pumping the engine room, which was proving as troublesome as on the first attempt. The water level dropped very slowly. The ship's pump was finally persuaded to function by changing the steam connection so as to reduce the length of line under water. The locomotive had previously been able to supply only enough steam to care for condensation losses, and practically nothing for the pump. With the shortened lead, the pump soon took a new lease on life, and the level of the water in the engine room rapidly lowered. At 9:30 P. M., observers had the satisfaction of seeing the *Allegheny's* stern slowly rise and the vessel right to twenty degrees. Their satisfaction was lessened by the fact that as the stern came up, the bow went down, for the bow compartments had again filled. The pump forward was operated at full capacity, but seemed unable to clear the hold of water as before.

Meanwhile, diving operations revealed the fact that the change of trim had cleared the opening in the shell plating from the bottom. A patch, which had been previously prepared, (Fig. 4), was lowered over the side, and two divers succeeded after about half an hour in placing the patch over the opening in what later proved to be an almost watertight manner.

Matters now appeared to be at an impasse; the stern was high in the air; only sufficient pumping was being done aft to hold what had been gained; no progress was apparent forward although the submersible pump was throwing about eight tons of water per minute from that part of the ship. It was felt that water was entering the fore hold through some new opening, and it was debated as to whether the fireroom should now be pumped, or operations suspended until daylight before taking



FIG. 4.—CLOSE-UP OF PATCH PUT ON "ALLEGHENY"

so radical a step. It was apparent and had been proven that the vessel should float with the fireroom flooded, if the fore hold were freed of water but it was not believed that she would free herself if the fore hold remained full of water. The ship quieted the argument, for at 2:30 A. M., the bow began to rise, the forward submersible pump all this time having been gaining slowly on a leak that developed in the hawse pipe with the increased trim by the bow; the change of trim had shifted the chain, which had torn out one of the wooden wedges driven in the hawse pipe.

The critical stage in the salvage had now arrived. The vessel was afloat and listed over at twenty degrees. Her unstable condition was revealed by a tendency to list still further. She started slowly over to starboard, and crabbed to port, easing off her masthead preventers, and crowding the inboard wrecking derrick against the dock. Timbers which had been placed at the corner of the derrick as chafing gear cracked and splintered, the masthead lines and masts groaned under the strain. The pumps, fore and aft, were working at full speed. The situation was a tense and dramatic one for all concerned. In the darkness, disaster loomed large; the turning turtle of the tug, with consequent wrecking of the two derricks and possible loss of life, seemed imminent. Nothing further remained to be done, except to pump, take up slack in lines, and hope. Providence was kind: at thirty degrees, the vessel hesitated, stopped listing, hovered a minute, and slowly moved back toward the vertical. Progress thereafter was sure and rapid, the water level dropping rapidly in all parts of the ship, which came nearer and nearer the upright. The main deck came out of water; the fireroom was pumped; inaccessible compartments were drained to the engine room bilges, and at 4:30 A. M., the *Allegheny* was afloat at but little more than her normal draft, and with only a few degrees list to starboard. At 11:00 A. M., the ship was towed to a local drydock, and docked for inspection and repair. Examination showed a badly bent stern frame shoe, in addition to the damage done by the *Orion's* propeller. Incidentally, it is interesting to note that the *Orion's* propeller was so slightly bent that she was not prevented from proceeding to her assigned destination, and that the personnel of the Air Station had the satisfaction of raising the *Allegheny* on the very day upon which the *Orion* returned to Pensacola from New Orleans. Indeed, the *Orion* anchored in the stream just as the salvaged *Allegheny*, slightly battered but still in the ring, was being towed to dock.

The *Allegheny* sank on July 5, and was floated on July 22. In view of the one unsuccessful effort, and of the many difficulties to be overcome, the performance is considered creditable, comparing favorably with similar salvages. The salvage equipment was invaluable, and the submersible pumps indefatigable. They operated in unheard-of positions, the one on the forward boom

performed at all angles, and functioned perfectly at one time with the boom being lowered away in jerks that seemed veritably to jerk the water away from it. It never faltered, and only gave up when it had established a suction head of twenty-five feet, and had wiped the fore hold clear of all except a little bilge water.

The total cost of the operations, including labor, material, power, transportation charges and salvage equipment, docking and repair of ship was less than \$7,500. The Board appointed to recommend salvage procedure informally estimated the value of the *Allegheny* as she lay at \$100,000, and the cost of salvage by contract, on a "no ship, no pay" basis at \$50,000. Aside from the monetary saving, great satisfaction was felt that the Air Station, unfamiliar with such operations, and poorly equipped, could accomplish such a feat without requiring the assistance of a regular salvage outfit.

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EVIDENCE

BY COMMANDER THOMAS D. PARKER, U. S. NAVY (Retired)

Recently, as a member of a permanent court-martial, the writer was impressed by the fact that often the court had to try the case and pronounce judgment without knowing the facts: that is, was forced to exclude important and material evidence; and this in spite of the (limited) discretion in applying the strict rules of evidence allowed by the Naval Manual.

To a mind untrained in legal refinements, this artificial blindness and deafness seemed lamentable—especially where a long prison term was in question. Though a pleasant life-long restriction, or lethal gas, may be the best cure for recidivists, no one cares to sentence boys or other first offenders on a half-knowledge of the case. To do this seemed hurtful not helpful to discipline.

Since those days of technically innocent profiteers and technically guilty recruits, the writer has had occasion to study these rules of evidence and the underlying theories. His earlier impressions are confirmed; learned persons, even judges and senators, have asked, "Must Justice be blind?"—to evidence?

This brief article deals only with the relation of the rules to naval courts.

But first the general question: Why is it that these Rules of Evidence are (largely) *Rules for the Exclusion of Evidence*?

The fundamental ground is distrust of the intelligence of juries.

"The jury, from the time it began to take on the character of an arbiter of the facts, must have been a disturbing element in the work of the court. It was an uncertain quantity, which, in the eyes of the judge, needed to be guarded against.

“ To what conclusions might not these men come; men ignorant of the law and its methods, unfamiliar with the ways of counsel, open to the influence of testimony and argument presented solely for the purpose of playing upon their sympathy, passion, and prejudices? This was a situation to be deplored, and to be relieved of its dangers as far as possible.

“Accordingly, with the beginning of the use of evidence before juries, we find the beginnings of the law of evidence. Statements to which the court might listen with impunity were carefully kept from the jury by excluding rules, established by the judges.”¹

Thus the constant fear was that the jury would over-estimate doubtful evidence; though all evidence is doubtful to some degree, and the rules as fixed seem arbitrary. For instance, dying declarations, however convincing, are admissible only in cases of homicide; and then, with various restrictions. They must be made “in contemplation of immediate death, with no hope of recovery”; they must relate “to the cause of death or the circumstances attending in the transaction resulting in death”; they are admissible only when “made by the person whose death is in issue on the trial.” Hence the exclusion of countless death statements that would create moral certainty in a reasonable man. For instance, in a California² case a written statement began: “Believing I am very near death and realizing that I may not recover,” etc. This declaration, of over-whelming importance, was ruled out because it suggested a faint remaining hope of recovery. In a Pennsylvania³ case, the deceased was found in a lane near the house in which, shortly before, his wife had been found, still living but badly beaten. Her dying declaration was held inadmissible because the accused was on trial for the murder of the husband.

To take an example in a different field: where proof is introduced with regard to “character” (as a material fact in issue) the strange rule is that it must be given only by way of stating what the witness believes to be the person’s general reputation—

¹ *McKelvey on Evidence*, Second Edition, p. 9.

² *People v. Hodgdon*, 55 Cal. 72.

³ *Brown v. Commonwealth*, 73 Pa. 321.

not what the character is, of the witness' own (perhaps intimate) knowledge. Many other examples could be given.

It is well recognized that the inelasticity of rules like these is unfortunate; and in some cases common sense has triumphed over the rigid exclusions of past decades. At one time a party to a suit could not testify; nor could an infidel or a Jew. But in civilian practice changes like these take hundreds of years.

There is always a theory underlying the rule; but in most cases an intelligent civilian forming a private judgment, or an intelligent captain on shipboard, would wish to hear and would consider (with a coefficient deduced from experience) the evidence that is legal poison to a juror. In particular cases judges realize that the result is law not justice; but they are sworn to uphold the law.

The laws of evidence crystallized centuries ago when the average juror had the intelligence of a Russian mujik. But, "When the reason for the law ceases the law should cease." The modern juror (whatever his shortcomings) does not believe in a flat world of witches and of evil eyes. He can reason a little and does not believe everything he hears. The United States Supreme Court says:⁴

"The disposition of courts and of legislative bodies to remove disabilities from witnesses has continued under dominance of the conviction of our time that the truth is more likely to be arrived at by hearing the testimony of all persons of competent understanding who may seem to have knowledge of the facts involved in a case, leaving the credit and weight of such testimony to be determined by the jury or by the court we have significant evidence of the trend of congressional opinion upon this subject."

How much more all that is said above applies to naval courts-martial! In place of the medieval juror with his round, red face and stubby beard we have, for jury as well as court, a body of experienced officers, all trained professionally and to some extent legally, most of them Annapolis or college men. Are their tender minds unable to digest facts? Must we slam ancient doors in their faces when they ask for truth? Must we say to

⁴ Mr. Justice Clarke in *Rosen et al v. United States*, 245 U. S. 467.

them: "You shall not hear these damning words because technically they are hearsay; you shall not hear A's dying confession because A had not absolutely abandoned hope; you must send this minor to prison because a clerk forgot to stamp the document that could clear him?"

Legal systems and administration are terribly cumbrous. Under our "dog-law," as Bentham calls it, a civilian cannot know he is wrong until hit on the head; cannot assert a right, because chained to a mass of procedural rules, like a dog to his block. The sound doctrine of *stare decisis* makes a change in these rules or in other law extremely difficult. But the Navy is a compact and in some respects, a self-determining body. The naval juror is a super-juror. He can "hear the testimony of all persons of competent understanding," and he can be trusted to weigh any evidence bearing on the issue.

That this view is not radical and is not opposed to the modern trend appears from the fact that various commissions (like the Industrial Accident Commission of California), having important judicial functions are now free to receive what evidence they please. Our own courts, which are not "courts of record," should be open to any testimony a wise captain would hear at the mast.

NOTE.—After the above was submitted, long after the thought had driven itself home, the writer chanced across the following dicta from high sources (the italics are his own):

Mansfield, C. J., in the Berkeley Peerage Case, 1811: "Upon this subject [hearsay] the laws of other countries are quite different; *they admit evidence of hearsay, without scruple*. There is not an appeal from the neighboring Kingdom of Scotland in which you will not find a great deal of hearsay evidence upon every fact brought into dispute. This has struck many persons as a great absurdity . . . But the different rules which prevail there and with us seem to me to have a reasonable foundation in the different manner in which justice is administered in the two countries. In Scotland, and *most of the continental states, the judges determine upon the facts in dispute, as well as upon the law*; and they think there is no danger in their listening to evidence of hearsay, because when they come to consider of their judgment on the merits of the case, they can trust themselves entirely to disregard the hearsay evidence, or to give it any little weight which it may seem to deserve."

Parke, B. in *Wright v. Doe dem. Tatham*, 1837: "It is true that evidence of this description has been received in the Ecclesiastical Courts [then part of the British judicial system]. But their rules of evidence are not the same in all respects as ours. *Some greater laxity may be permitted in a Court which adjudicates both on the law and on the fact*, and may be more safely trusted with the consideration of such evidence than a jury."

The Continental Courts, with their Roman tradition, the Scottish Courts, the Ecclesiastical Courts, even an English Chief Justice! The writer respectfully yields the floor to these.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

BRITISH SUBMARINES IN TURKISH WATERS

BY LIEUTENANT COMMANDER H. H. FROST, U. S. NAVY

The exploits of the British submarines in the Dardanelles and the Sea of Marmora constitute one of the brightest and most interesting chapters of the history of the World War.

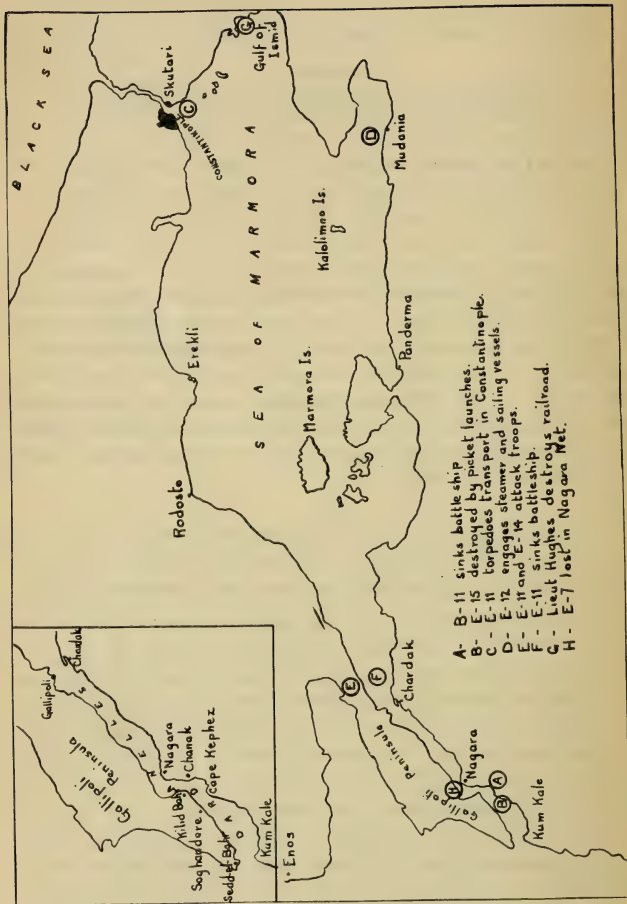
While the individual adventures of famous submarine commanders make the most interesting reading, it must not be forgotten that all the submarine operations fitted into a carefully planned campaign, in which great pressure was brought upon the Turks, and powerful assistance to the troops on the Gallipoli Peninsula was afforded.

THE SINKING OF THE "MESSUDIYEH"

Lieutenant Normal Holbrook, in the little Submarine *B-11*, was the first British commander to enter the Dardanelles.

During the early morning of December 13, 1914, he proceeded on the surface to a position off the entrance to the straits. At dawn he dove and went ahead slowly toward Sedd-el-Bahr, with the object of attacking the converted merchant vessels used by the Turks in the Dardanelles. After running totally submerged for four hours, he came up close to the surface and took a look through his periscope. To his surprise he saw close aboard on his starboard beam a large Turkish man-of-war.

The *B-11* turned to starboard toward the enemy and when 600 yards distant fired a torpedo. The boat immediately dove and turned away. In a few seconds a loud explosion was heard and Holbrook came up to take a look; the enemy ship, which he recognized as the old battleship *Messudiyeh*, was firing her broadside battery in his direction. The submarine by this time had



acquired a little too much negative buoyancy, and before her commander could see any more, went down below periscope depth. By the time she could be brought up again it was seen that the battleship was sinking by the stern and that she had ceased fire.

Up to this time Lieutenant Holbrook had had no opportunity to fix his position, but now after swinging his periscope about for a careful look, he found that he was in Sari Siglar Bay, just south of the Narrows. Turning his boat around, he commenced his return trip; his compass at this critical moment became so blurred that it could not be read. This fact would have compelled the submarine to run continually with its periscope showing, but fortunately in a short time the compass was again in commission, thus permitting the boat to run completely submerged.

By 2:00 P. M. the *B-11* was out of the straits, having accomplished a brilliant feat and demonstrated that it was possible for a well-handled submarine to penetrate into the Dardanelles. Lieutenant Holbrook was awarded the Victoria Cross.

DESTRUCTION OF THE "E-15"

During the naval attack on the Dardanelles in the spring of 1915, submarines were used for reconnaissance in the straits. On the night of April 17, the evening before the great attack, *E-15* was sent into the straits to examine the minefield off Cape Kephez. The submarine ran aground immediately under the guns of a Turkish battery and her crew was taken prisoner before being able to destroy the boat.

In order to prevent the boat from being raised and used by the Turks an expedition to destroy her was organized for the following night. Lieutenant Commander Eric Robinson commanded the expedition. With him in the picket boat of the *Triumph* were Lieutenant A. B. Webb, R. N. R., and Midshipman John Woolley. Lieutenant Claud Godwin commanded the picket launch of the *Majestic*.

Under cover of darkness the two boats headed in toward the submarine, which was only about 300 yards from the enemy battery. Being discovered and covered with a heavy artillery fire, the *Majestic's* picket launch was sunk and one man killed.

The *Triumph's* boat, however, torpedoed and destroyed the submarine, picked up the crew of the other boat and retired without further loss, although no less than 200 rounds were fired by the fort during the action. Lieutenant Commander Robinson was promoted to commander for his gallantry in this daring enterprise.

An expedition which was almost exactly similar to the burning of the *Philadelphia* by Stephen Decatur was hardly to be expected under modern conditions. Nevertheless, naval warfare always follows the same lines, as was shown in the Battle of Jutland, when Vice Admiral Hipper boarded a destroyer and hoisted his flag on another ship in much the same way that Perry did at Lake Erie.

THE FIRST PASSAGE OF THE DARDANELLES

The Australian submarine *AE-2*, Lieutenant Commander Stoker, was the first boat to go through the Dardanelles. The boat started out just as the great landing attack on the Gallipoli Peninsula was being carried out.

At 2:30 A. M., April 25, 1915, the *AE-2* entered the straits on the surface. After running slowly for two hours, the enemy batteries on the northern shore opened fire and *AE-2* dove immediately to seventy feet. During the next half-hour many cables could be heard scraping along the ship's side.

When off Chanak, Stoker came up to have a look through his periscope. He immediately torpedoed a gunboat and dodged a destroyer which attempted to ram him. Then the compass went off and *AE-2* ran aground off Fort Anatoli Mejidieh. She came off easily and proceeded up the channel at ninety feet. This time the boat ran aground off the European shore and slightly damaged the hull. In getting off the boat was detected by the enemy and chased by numerous patrol vessels.

At 8:30 A. M., after six hours of adventures, Stoker decided to lie on the bottom near the Asiatic shore to allow the excitement to subside. He lay there undisturbed until 9:00 P. M., when *AE-2* came to the surface and charged batteries. At 4:00 A. M. she proceeded and during the early morning attacked two unknown men-of-war without success. At 9:00 A. M. the submarine entered the Sea of Marmora.

After four days of unsuccessful operations in the Sea of Marmora, *AE-2* was sunk by an enemy torpedo boat, all the officers and crew being saved. Although Stoker's cruise had been unsuccessful, he had won the honor of showing the British submarines the way into the Sea of Marmora, where they performed such famous exploits.

FIRST CRUISE OF THE "E-14"

Holbrook had shown the way into the Dardanelles, Stoker into the Sea of Marmora; Lieutenant Commander E. C. Boyle in the *E-14* was now to have the honor of being the first to carry out a successful cruise in the Sea of Marmora.

His adventures in the Dardanelles were similar to those of Stoker. At 1:40 A. M. of April 29 he started on his cruise. At 4:00 he was picked up by the searchlight at Soghandere and fired at by the enemy batteries. After diving under the mine-field he came to the surface again and ran through the Narrows under a hail of projectiles.

Being compelled to dive by patrol vessels, he torpedoed a gunboat and passed Nagara. He gradually made his way through the straits being chased and fired at on numerous occasions by enemy destroyers and gunboats, one periscope being squarely hit by a shell.

The next afternoon two transports, escorted by three destroyers, were made out. Here was the first opportunity for attacking the Turkish water communications between Constantinople and the Gallipoli Peninsula, the principal task of the British submarines. Boyle succeeded in hitting one of the transports with a torpedo and saw her head toward the beach with dense yellow smoke pouring out.

During the first week of his cruise in the Sea of Marmora, Boyle had little further opportunity of attacking the enemy communications, as he himself was hunted almost continually by Turkish destroyers and patrol vessels. The smooth sea was a great handicap to him, as the wave made by his periscope could under these conditions be seen at great distances. The wake of torpedoes could also be seen and this permitted three patrol craft to avoid being hit.

On May 5 he hit a destroyer, but the torpedo failed to explode. During the next few days he chased numerous transports, and created a great moral impression on the Turks, although he had little actual success. On one occasion the *E-14*, while chasing a transport on the surface, got in so close that she was hit several times by the rifle fire of the troops. Finally on the evening of the tenth he fired two torpedoes at two enemy transports, escorted by a destroyer. The first torpedo missed, but the second hit and exploded with splendid effect, the transport sinking quickly.

On the thirteenth a small steamer was chased ashore and an action with rifles carried on with its crew.

On the seventeenth, all torpedoes having been expended, the *E-14* was called by radio, and successfully passed down the straits with the usual adventures.

The cruise of the *E-14* had been a very successful one, but it was demonstrated that, had even a small gun been mounted, much more severe losses could have been caused to the enemy.

The commanding officer was promoted and awarded the V. C., while the other officers, Lieutenant Stanley and Acting-Lieutenant Lawrence, were given the D. S. C.

FIRST CRUISE OF THE "E-II"

Immediately after the return of the *E-14*, another submarine, the *E-II*, went through the Dardanelles into the Sea of Marmora. Her commander was Lieutenant Commander M. E. Nasmith. He proceeded toward Constantinople and on the morning of the twenty-third torpedoed and sank a torpedo-boat anchored off the harbor. As the ship went down, her crew gallantly manned a six-pounder and destroyed the forward periscope of the *E-II*. A few hours later a small steamer carrying a 6-inch gun and ammunition to the Gallipoli Peninsula was captured and sunk. To close the day Nasmith torpedoed a loaded supply ship, drove a second one on to the beach and carried on an action with Turkish cavalry by means of rifle fire. It would hardly have been possible to crowd more action into a single day.

The next exploit of the *E-II*, was a direct attack on Constantinople. In full daylight she dove into the harbor and came up to periscope depth close to the American yacht *Scorpion*. Two

torpedoes were fired, one of which missed; the second, however, hit the transport *Stamboul* and blew a hole twenty feet wide at her waterline, so that she had to be grounded in shoal water. Although the submarine was covered with a hail of fire from the batteries, she dove and escaped without damage.

After carrying out various other operations Commander Nasmith passed out through the Dardanelles on June 7, after an extremely successful cruise. During the passage he "observed a large mine preceding the periscope at a distance of twenty feet, which was apparently hung up by its moorings to the port hydroplane." As the fire of the forts made it impossible to come to the surface, Nasmith was compelled to run on in this perilous situation until he was outside the straits. Then he blew his after tanks, sending his bow down. In this position he went full speed astern, and the mine fell off.

For this splendid cruise Commander Nasmith was awarded the Victoria Cross.

AN ADVENTURE OF THE "E-12"

On June 10 Commander Boyle started his second cruise in the famous *E-14*.

Nine days later Lieutenant Commander K. M. Bruce in the *E-12* came up and met him in the Sea of Marmora. On the twenty-fifth the *E-12* had her great adventure.

During the forenoon, while on patrol off Mudania, the submarine sighted a small steamer, towing two sailing vessels. Farther off was another steamer, towing three vessels. The *E-12* was the first boat to mount a six-pounder gun and now Commander Bruce determined to test it out in an attack on the surface. As he approached the nearest tow, the crew of the steamer stood on deck wearing life-belts and nothing appeared suspicious. Bruce ran the submarine alongside, and his first lieutenant with a few men boarded the steamer.

At this instant a Turk threw over a hand grenade, which hit the submarine, but fortunately did not explode. Then they opened fire with a small gun concealed in the after part of the ship and also with rifles. The British returned the fire with the six-pounder and rifles. While this hot action at ten yards range was going on, the two sailing ships in tow came up and their

crews also opened up with rifles. Finally, after the steamer had been hit ten times with six-pounder shells, the Turks surrendered, and Bruce proceeded to sink all three ships.

This accomplished, he headed in for the other tow. The second steamer ran on the beach and was supported by a gun on shore, but the *E-12* succeeded in setting her on fire, before being forced to retire.

THE "E-7's" ENGAGEMENT WITH A TRAIN

When the *E-12* was recalled on June 28, her place was taken by the *E-7*, Lieutenant Commander Cochrane, who soon demonstrated that he was one of the finest British submarine commanders. During his eventful cruise he sank no less than five steamers and sixteen sailing vessels. In one case he had to dive under a line of sailing ships to sink the 3,000 ton steamer *Biga* while she was tied up to the pier at Mudania. Having made every kind of an attack on the enemy afloat, Cochrane decided that he must vary his operations by an attack on the Turks ashore.

On July 17 he emerged close in to the shore, where a railroad cutting was in easy range of his six-pounder. After destroying the cutting he proceeded along the shore to the eastward. Soon he saw a long train running in the opposite direction, that is, toward the destroyed cutting. He followed up the train and soon saw it returning toward him. The *E-7* then came up and opened fire. After twenty shots had been fired three ammunition cars blew up with a terrific explosion. Cochrane then went back to the destroyed cutting and, sighting another train, hit it several times before it could get out of range.

On July 24 Cochrane ran down through the straits, being twice held up in obstructions for over one half hour. Each time he managed to get clear by patiently maneuvering his boat. His cruise had been the finest thus far, both in actual results and in daring and coolness in emergencies.

On July 21 Commander Boyle had brought up the *E-14* for her third and most successful cruise. In three weeks he sank one steamer, one supply ship, seven dhows and thirteen sailing ships. He practically cleared the sea of Turkish craft, and forced the troops assigned to the Gallipoli Peninsula to go by train from

Constantinople to Rodosto, and thence to Gallipoli by a three days' march, instead of by a simple trip by steamer.

THE SECOND CRUISE OF THE "E-II"

On August 5, 1915, the *E-II* entered the Sea of Marmora for her second cruise in Turkish waters.

On this occasion the Dardanelles was passed without important incident and on the afternoon of the sixth *E-14*, Lieutenant Commander Boyle, was met at the appointed rendezvous. This was interrupted by a Turkish gunboat, which the *E-II* hit amidships with a torpedo and sank. The two commanding officers then drew up a plan of operations for the next day.

In accordance with the plan the two boats took up assigned positions along the European shore to the eastward of the city of Gallipoli to wait for Turkish troops and convoys marching toward it.

Twice during the morning the *E-II* sighted troops through her periscope, came to the surface, manned her little twelve-pounder gun, and dispersed the marching columns. Commander Nasmith then stood down toward the other submarine.

Early in the afternoon, both submarines saw dust clouds rising from the road along the beach, came up and opened fire. Commander Boyle fired forty rounds with his little six-pounder and Nasmith was able to do even more effective shooting, as he had the larger gun. The action was continued for nearly an hour, when the Turks brought a field battery into action, forcing the submarines to submerge. After patrolling around for a while the *E-II* again came to the surface and carried out a brief bombardment before being driven down by the field battery. Two submarines had blocked the shore road for an entire day.

During the eighth both submarines patrolled the eastern entrance to the Dardanelles. The *E-14* torpedoed and sank a large supply ship; the *E-II* had the good fortune to sight the old battleship *Haireddin Barbarossa* proceeding under the escort of but one destroyer. Commander Nasmith skilfully maneuvered his boat into a good firing position and hit her full amidships with a torpedo. The ship, severely damaged, headed for the shore, but soon blew up and sank. Before going down the

Turks gallantly stood to their guns and kept up a heavy fire, which of course had no effect on the submarine.

The *E-2* now entered the Sea of Marmora to serve as the relief for *E-14*. While passing up through the Dardanelles the *E-2* had a very exciting adventure. Off Nagara the boat ran into an anti-submarine net. By looking out of the conning tower ports through the clear water a large wire hawser could be seen caught under the barrel of the gun, while a smaller cable was against the conning tower itself; still another had fouled the wireless standard aft. The captain, Lieutenant Commander David Stocks, had to maneuver around for ten minutes before he could get clear; during this time Turkish patrol boats threw down many bombs which exploded around the boat. Had these been the 300-pound depth charges which were used later in the war, the submarine would have had little chance of escaping, but the small bombs then used by the Turks had no effect. After getting clear a Turkish destroyer followed the boat for a long time, but Commander Stocks finally was able to get away. The Turkish destroyers were at that time none too eager to engage British submarines.

After a brief conference between the commanders of the two submarines it was decided that they operate singly for a week. *E-11* sank two supply ships and one collier during the first few days and devoted another day to firing at troops and convoys on shore. Commander Nasmith then conceived a bold plan of blowing up the important railroad which led from Scutari to Ismid. The submarine proceeded to Kalolimno Island, where a day was spent in constructing and testing out a raft; this was then lashed on the deck of the boat and it proceeded into the Gulf of Ismid toward the point selected for attack.

At about 2.00 A. M. the submarine was grounded at the foot of a steep cliff and Lieutenant D'Oyly Hughes started out on his perilous adventure. He swam ashore, pushing ahead of him the raft, which carried a large charge of guncotton for the demolition of a railroad bridge which was near at hand.

As Lieutenant Hughes walked along the track with his heavy burden, he saw three men sitting alongside it talking. Making a wide detour around them he reached the bridge, where unfortunately a fire was burning and a number of men were working.

It was evident that the original plan of blowing up the bridge was impracticable. Hughes therefore retraced his steps and discovered a place where the track crossed a slight hollow over a brick support. This was located only 150 yards away from the three men sitting by the track, and unfortunately it was necessary to fire a pistol to ignite the fuse of the demolition charge. Nevertheless, Hughes decided to destroy the track at this point, despite the fact that the Turks would be certain to hear the report of his revolver.

After firing the charge Hughes ran along the track, followed by the three Turks. The latter, of course, could not tell how many enemies they were in contact with and apparently did not push their chase very rapidly, because Hughes was able to keep them at a distance by firing his revolver. After running for about three-quarters of a mile, he ran down to the beach and swam off into deep water. At that time the demolition charge went off with a great explosion, sending a great mass of debris over the *E-11*.

When once out a considerable distance from the shore Lieutenant Hughes blew his whistle, but he was so far from his boat that it was not heard. He then made a daring decision to go in to the beach again. After getting a good rest he entered the water again and this time swam along the shore toward the *E-11*. Just at daybreak he rounded a point and saw the submarine. This time his whistle was heard and the boat headed toward him. But now the Turks were also alarmed and they covered the water around the swimmer with heavy rifle fire. Fortunately their fire was inaccurate in the dim light and the *E-11* picked up Lieutenant Hughes and dove to safety.

On the twenty-first the *E-2* was met at the appointed rendezvous and the boats commenced a second week of operations alone. During this time the *E-11* sank a tug, a sailing vessel and two large transports.

On the twenty-eighth the two boats met off Mudania and carried out a combined bombardment of the magazine and railroad station. On September 1 a number of hits were made on a railroad bridge and two days later the *E-11* left the Sea of Marmora, having an uneventful passage down the Dardanelles.

The cruise had lasted twenty-nine days, all of which had been spent in enemy waters. Commander Nasmith had carried out

every form of an attack which it was possible for a submarine to make. In addition to this, Lieutenant D'Oyly Hughes had performed a feat of such daring as has rarely been equalled in British naval annals.

"E-12" IN THE NAGARA NET

Lieutenant Lyon of the *E-2* now volunteered to repeat the exploit of the first Lieutenant of the *E-11*. For practice he swam in and destroyed two dhows during the night of September 7. The next night he started in with a raft and a guncotton charge to blow up a bridge, but an explosion on shore was all that was ever heard of the gallant officer, whose unfortunate expedition much resembled that of Lieutenant Somers of our own Navy in the harbor of Tripoli.

Commander Bruce of the *E-12* was the next to cruise in the Sea of Marmora, where he held forth for no less than forty days, during which time he sank such shipping as was still at large and amused himself by firing at a powder factory near Constantinople. His principal adventure, however, was his encounter with the Nagara Net on his return trip.

Running squarely into the net, the *E-12* broke off a part of it and towed it with her. The extra weight gradually carried the boat down, and to cap the climax a strand of the net jambed the forward hydroplane so that it could not be moved to bring the boat up.

Bruce immediately blew his forward tanks and gave her full speed, but still she went down to the great depth of 245 feet. The glass eye-parts of the conning tower crashed in, and the conning tower had to be cut off from the rest of the boat. The forward compartment also began to leak. As the storage batteries were in this part of the boat, this compartment also had to be closed to prevent the deadly chlorine gas from reaching the crew.

The boat was in this terrible situation for full ten minutes, but finally three men moved the forward hydroplane and the boat shot up to twelve feet before she could be steadied. She was now partly out of water and six patrol boats joined in the frolic by opening fire. Bruce got her down to fifty feet before being hit.

The compass went out of commission and only one depth gauge was left, but the *E-12* kept on at a depth which averaged about eighty feet. At Kilid Bahr she ran into another net, and Bruce in desperation went full speed. To his astonishment it came off and with it the old net also. This threw the boat out of control and her bow came out of the water. Numerous shore batteries and patrol vessels opened fire. One shell smashed the already ruined conning tower; several others hit the bridge; two torpedoes passed astern, but still the gallant *E-12* came on through the straits after probably the most extraordinary adventure experienced by any submarine. Her brave officers and crew deserve the highest praise we can give them.

THE END OF THE "E-7"

During November and December Commander Nasmith made his third and record-breaking trip in the *E-11*. This time he remained on his hunting ground for forty-eight days, in which he sank no less than forty-six ships, of which one was a destroyer and ten were steamers.

One of the last operations of the campaign resulted in the sinking of the *E-7* and the capture of her famous commander, Lieutenant Commander Cochrane.

At 6:30 o'clock one morning the *E-7* passed Kilid Bahr, running with periscope out. One hour later the buoys of the submarine net at Nagara were sighted. Cochrane dove to 100 feet and increased speed to seven and one-half knots.

The *E-7* ran full into the net; her starboard propeller fouled the cables and she swung around into the net broadside on, becoming completely entangled in it. A mine exploded near the boat, but did no damage.

From 8.30 to 10:30 A. M. Cochrane backed and filled in vain endeavors to get clear of the net, which now was caught to both the bow and stern of the boat. A second mine then exploded close to the boat, breaking electric light globes and causing other slight damage.

The coolness of the heroic captain is well shown by his plans at this time. "After the explosion the boat was much freer than before, and in the hope that further attempts to blow up the

boat might result in completely freeing her, I decided to remain submerged at a good depth until after dark, when it might be possible to come to the surface and clear the obstruction."

After 2:00 P. M. the reduced battery power of the boat made it necessary to give up further attempts to get clear. At 6:40 P. M. a mine exploded almost against the hull and this time severe damage was done. Once more the motors were started, but the boat was still fast.

As a number of boats were heard patrolling above the submarine, it was evidently impossible to clear the obstruction after coming to the surface. Cochrane was therefore forced to the decision to come to the surface, destroy his boat and then surrender. The entire crew was rescued by the Turks; the *E-7* was blown up and sunk by a demolition charge, the fuse of which was lighted before the boat was abandoned. Cochrane made two attempts to escape from captivity. The first time he was retaken when only ten miles from the seacoast; the second time he got away after many exciting adventures.

DISCUSSION

The Part of Engineering in Command

(See Whole No. 240, Page 203)

REAR ADMIRAL W. V. PRATT, U. S. NAVY.—I have read with interest the article in the February number of the United States Naval Institute entitled, "The Part of Engineering in Command" by Rear Admiral John K. Robison, U. S. Navy. I have also read with interest the discussion of this article by Rear Admiral Henry B. Wilson, U. S. Navy.

The first point of interest that I note (and it seems to me a step in the right direction), is to place the article and the discussion in close proximity to each other or if there be more than one discussion to place the discussions immediately after the original article. In this way the reader gets the advantage of the various points of view. I should be glad to see this method followed in the future.

The next interesting point to me is the fact that there are two distinct points of view. One as represented by the author of the article and the other the point of view of the critic. If I may take the liberty of saying so, I think the truth lies somewhere between.

In reading Admiral Robison's article I did not get the impression that it was in the nature of a sales talk but I did get the impression that the Admiral felt that there was a need for the officers of the service to know the relationship existing between engineering problems and the problems of the higher command.

If Admiral Robison's article intends to imply that officers are not fitted for the higher command unless they have an intimate knowledge of the technical details of engineering I am inclined to disagree with him. If, on the other hand, he means that every man exercising high command should have a knowledge of the capacities and limitations of engineering and by the use of this knowledge be able to form accurate judgments; if in addition to what engineering knowledge he may have, he also has the ability to choose such men as may have the intimate technical knowledge that he requires, and knows how to use these men, then I am quite in accord with Admiral Robison.

There is a very definite need for officers exercising high command afloat and in administrative positions on shore to have a working knowledge of engineering problems, sufficiently accurate, so that their judgments may be sound. The broader problems of engineering are quite similar, that is, from the operating point of view, to those which are presented in the movements of troops and supplies and which are generally summed

up under the head, logistics. In the lower commissioned grades engineering problems are analogous to those presented by gunnery, navigation, and other similar tasks falling to the lot of the younger officer. It is quite as essential that the young officer should go through a course of practical engineering instruction afloat, as it is that he should go through the turret, be a watch officer, know the details connected with the plotting room, be familiar with the fire control or be conversant with the general duties of the officer of the deck. But as an officer grows older in experience, the technical side of his profession merges into a broader aspect, and when he arrives at high command, the qualities which are essential for him to possess, such as judgment, determination, decision, fearlessness to take responsibility, and general knowledge, can be gained by passing through any one of the earlier schools of experience; but undoubtedly, such an officer will not be as thoroughly grounded in his profession as if he had passed through all of the schools.

I wish nothing that I may say to be taken as meaning that the younger man should not take just as much interest in the engineering side of his profession as he takes in gunnery or in any other one of the tasks which fall to his lot. It is exceedingly important that he should be as thoroughly grounded in engineering duties as he should be in his other duties.

There is, however, a reason why in the problems of the higher command afloat, engineering has not received the prominence that it should. It will never receive the importance that certain other broader sides of a naval man's profession receive, nevertheless its importance must be appreciated. The reason for that, to my mind, is this: The average American mind, and the naval officer is no exception, is never content with receiving information, translating it into routine work, and giving out nothing more than a mechanical output. The genius of the American intellect is highly creative. The result of this is that when an officer reaches the higher command, if his bent lies in engineering work, his problems then are those of design, creation, and he will find his best efforts on shore. The navy has provided for that. On the other hand, the officer in high command afloat, finds that his most creative work lies in the field of strategy and tactics. He must have a working knowledge of engineering, in the same way that he must have a working knowledge of gunnery, but his task is that of the great co-ordinator, the maker of war problems, the inspector in chief, and the critic of the efforts of others. For these reasons I believe that the higher command afloat will always be more interested in the broader problems of his profession than he will be in the technical details of any one particular phase of his work.

In conclusion, I should like to state that I hope nothing will be taken as decrying the need of a thorough understanding of the capabilities and limitations of matériel, which for the officer afloat is his great engineering problem. On the other hand, while I am not convinced that post-graduate courses which take our younger men too far afield into the realm of engineering are a good thing for too many officers, I am thor-

oughly convinced that every officer should pass through the school of the engineer afloat.

The Part of Engineering in Command

(See Whole No. 240, Page 203)

CAPTAIN D. W. KNOX, U. S. NAVY.—The article of Admiral Robison is of more than passing interest and importance. It not only deals in the broad general problems with which the higher naval command will be confronted in war, but also shows their intimate relation to concrete engineering problems. The close and vital connection between engineering and higher command is thus made manifest; and herein lies the special value of the article, because of an unfortunate and increasing shortage of officers duly qualified in engineering—caused primarily by an erroneous belief that engineering duty is not an essential groundwork for high command.

Not many years ago the article of Admiral Robison's would have been regarded by the service at large as in conflict with the purposes of the War College—a cry from the material school of officers. Fortunately at the present time so many officers have taken the College course that no misunderstanding of this nature can exist. It is of course true that the College deals principally in the employment of an instrument—the naval establishment; but to assume the College to be so engrossed in employment as to be uninterested in the instrument itself is manifestly absurd. Indeed one of the greatest impulses toward perfecting the instrument springs from deficiencies made evident in employment.

Of late years the War College has given special attention to the subject of command, in which one of the most important elements is deemed to be the reaching of sound decisions quickly. Good technical judgment is a cardinal pre-requisite of a quick decision that will prove sound. Such technical judgment must include not only strategy and tactics, but also logistics—the maritime, engineering, and gunnery aspects of our profession.

The logistic judgment acquired by practical experience, which each officer takes to the War College, is an indispensable preparation for the work there. If that logistic judgment is deficient in engineering, the quality of the officer's work at the College will be seriously impaired; just as it would be if the judgment was deficient in seamanship or gunnery. Certainly no officer whose general judgment has been broadened by earning a College diploma will minimize the great value of engineering judgment, based on engineering experience, in conducting naval warfare.

"The Job"

(SEE PAGE 1915, WHOLE NO. 237)

CAPTAIN STANFORD E. MOSES, U. S. NAVY.—In the PROCEEDINGS of the Naval Institute there was recently published an article called "The Job": an essay dealing largely with the duties of division officers, and the conversion of raw recruits from civil life into the best type of men for the Navy.

Parts of that essay are helpful, and much that the author urges in the way of more careful and thorough indoctrination of new men is in the right direction; but exception must be taken to one suggestion offered.

The following comments upon the article referred to are not submitted in hasty criticism, but after discussion with some of the older and most experienced officers of the Navy, as well as with younger officers, petty officers and men. It is hoped by this discussion to neutralize or reduce to a minimum the harm which might result from any adoption of one particular suggestion offered by the author of "The Job." He offers four suggestions:

(1) A card index is recommended; to be kept by division officers, giving detailed information in regard to each man.

(2) This second suggestion relates to instruction by squad leaders and division officers.

(4) A board to examine undesirables is recommended.

The third suggestion is the one which seems fundamentally wrong. It is as follows:

(3) "All divisional officers to be in their rooms one (1) hour a day, at a specified time, to answer personal questions, investigate special cases or to confer with petty officers, as they may elect."

A discussion of this suggestion will be postponed until the others have been disposed of.

(1) A card index containing "complete information about every man, including a transcript of his current enlistment record, the members, ages and residence of his family and a rough log of his progress" would be an excellent thing. Duplicate service records have been recommended for similar use, and duplicate service records officially authorized, to be transferred with the man, would be more valuable than the card index recommended. The service record form is the result of many years of experience and provides for much valuable information regarding men. The condensed history shown on a service record would be of great assistance to division officers if properly understood and used. The front and back pages give the man's physical, personal and family history; his age, previous training or experience, his home address, next of kin, dependents or beneficiaries, and other information. Marks for proficiency and for conduct give at a glance the record previously made; while entries showing advancement in rating, meritorious conduct, offenses, special qualifications and details will help to give a fairer estimate of the man.

(2) The question of periods for divisional instruction under squad leaders and division officers is a matter of fleet or ship routine, and there seems no necessity for special recommendations in this matter.

(4) As to a Board for investigating the undesirability of "undesirables": It has been said that "Boards are wooden and long and narrow," but a careful investigation extending over a period of years leads to the conclusion that many men are discharged from the Navy as undesirable when more careful and painstaking investigation of their troubles might have saved good men for the Navy and made them better citizens. It should never be forgotten, and the experience of the Army in this respect is much the same, that men discharged for cause or as undesirable may greatly injure the reputation of the service. Naturally, a man who has been kicked out goes out with a sore spot. He will make the best of his case, even though he has a bad case. There are two sides to every question, and the point of view of the man discharged as undesirable, which is the point of view of his friends and family, places the blame upon the Navy if the circumstances can be so construed.

The real danger lies in the cases where the Navy is at fault and where the man has at least a measure of justification or right on his side.

This idea of a board to sift the cases of men reported undesirable or inapt has been tried with notable success in one of the largest and most successful business organizations in the world. In that organization a man may be "fired": but he is fired to an adjusting committee of selected men of experience and tact. He is not thrown out of the organization. Not one man in a thousand was discharged from that organization in the course of a year. With a Navy of one hundred thousand men this would mean less than one hundred men discharged for cause each year. Such a result would be a great increase in the economical and efficient handling of the Naval personnel.

In the large manufacturing company referred to, the committee hears the reason for the man's discharge; hears the complaint by the head of the department or foreman, and then hears the man's side of the case. The man is then given a trial in another department; and then in another department after that if he fails to satisfy again, and again.

There was an extreme case of one man who was dismissed fourteen times without ever leaving the organization; the man evidently finding a billet which suited him and in which he rendered efficient service, satisfactory to a foreman who was difficult to please.

There is a lesson for the Navy in this story. A board or committee is not recommended for a military service; but in the Navy there should be more patient and painstaking investigation of reported offenses, and more flexibility in the effort to adapt new men to a fitting rating and environment.

Men serving in their first enlistment should be afforded every reasonable opportunity to change their rating if they find themselves assigned to work for which they have no aptitude or in which the conditions are uncongenial. It is too much to expect of young men and boys from civil life that they

should invariably enlist in the Navy in the branch or rating best suited to their abilities and tastes; or in which they can serve to best advantage. Instances could be multiplied of men who joined the Navy to "see the world and learn a trade," and who became discouraged because they felt they were doing neither.

The promise of an opportunity to see the world is fulfilled more frequently than the promise of an opportunity to learn a trade. The Navy is very active, and recruits in traveling from their homes to a Training Station, and from Training Stations to their ships on the Atlantic, Pacific, Asiatic or Mediterranean stations see a good deal of the world. Exceptions are rare.

But in the matter of learning a trade it too often happens that a boy with a mechanical turn of mind is lashed to the handle of a swab by a boatswain's mate or division officer who refuses to spare him for transfer to the dynamo room, torpedo room, or carpenter's gang when the boy applies for a change. The inability to secure a change in rating has thrown many men out of the Navy or into prison. Every man so lost costs the Navy a thousand dollars or more. A thousand men discharged for cause or for undesirability or inaptitude means the loss of a million dollars. This money loss, great as it is, does not tell the whole story, or even the main part of the story. Dissatisfied men, if their discontent is allowed to fester, are rotten apples in the barrel. The infection of their contamination spreads to others with whom they come in contact. The cost in decreased efficiency due to discontent cannot be measured and the reputation of the Navy suffers from the bad impression given to the families and friends of the men discharged.

Coming now to the main point to which exception is taken in the article called "The Job"; the third suggestion offered in that essay was: "All division officers to be in their rooms one (1) hour a day, at a specified time, to answer personal questions, investigate special cases or to confer with petty officers, as they may elect."

Younger officers of the Navy should not by any mischance be permitted to accept that suggestion unchallenged. It should be asserted most emphatically that division officers should not receive petty officers or enlisted men in their rooms at a specified, or at an unspecified time; either to answer personal questions, or to investigate special cases, or for conference, or for any other reason.

The officers' quarters on board ship are their homes and cannot fittingly be used for consultation and conference with enlisted men any more than bedrooms and dining-rooms in the private homes of doctors and lawyers could properly be used for purposes of consultation and conference with patients and clients. The officers' quarters are their homes on board ship, and no effort should be spared to make them homelike and to foster among the members of each mess a friendly, family feeling, where the utmost freedom prevails.

Such a spirit would be destroyed if officers' quarters were made public highways and business offices. It is only a step from such a suggestion down to the condition of men coming in overalls or working clothes with papers, tools or gear; making the officers' quarters an annex to the office, deck or work-shop.

There are other latent evils in the suggested plan of having petty officers or men come to officers' rooms for consultation or conference. There is an undesirable element of secrecy about the whole proceeding. There is no need for such privacy in the relations between officer and man. Business should be transacted and work done in the places provided for business and work. An officer can take a petty officer or man to a vacant part of the deck, out of earshot but always within sight, and transact all of the confidential matters which need pass between them. The evils which would follow a general adoption of the suggestion to receive men in the officers' rooms are numerous and certain. This has been repeatedly proved by experience, and to forestall and prevent such evils no words of warning can be too emphatic.

There are exceptions to every rule, but as a rule the first time a man enters an officer's room should be after he wins his commission and is no longer an enlisted man, but an officer.

The handling of men, and particularly the handling of first enlistment men, is a matter of such vital importance to the Navy that a few suggestions gathered from thirty years' experience will be submitted as a substitute for the practice to which objection has been raised. Division officers should realize that advancement and promotion are often a matter of as much importance to a seaman or fireman as they are to an ensign or a lieutenant. They should remember that there is a constant flow of promotion among enlisted men, with new duties to which those who have been promoted must become accustomed before they can be expected to be highly proficient. At the bottom of the ladder of promotion there is a constant stream of recruits who are utterly ignorant of the customs of the service and who need their division officers' most careful attention, consideration, and direction; need their leadership.

It is rarely necessary to place a man on report. Division officers should realize that their commissions re-enforce their authority with all of the power of the Government of the United States. Without harshness or arrogance, but with firmness and justice, officers should be able to discipline their men ("to make disciples or followers of them") without appeal to higher authority. When an officer places one of his men on report he confesses, in the majority of cases, that he is unable to control the man, and is calling for help.

A fundamental truth which all young officers should learn is this: that the interests of the Navy are best advanced by advancing the interests of the individual man. No man is indispensable in any billet, and if one is refused transfer or a change in rating because he is needed in his present billet, such refusal is unjust to the man and penalizes efficiency.

When an office-holder was urged upon President Lincoln as the "only man for the job," Lincoln suggested that the job be abolished, as the man might die.

A man should not be held until a relief can be provided or because his services are required where he is, if the man himself would be benefited by transfer or change in rating. In the long run the best thing for the individual is the best thing for the ship and for the service, and "the job" for division officers is to know their men better than the men know themselves; to inspire them with interest and to encourage them at work and play.

Idleness and inactivity are the greatest enemies of discipline and efficiency. The man who works hard, plays hard, and gets his just deserts is usually the efficient, contented and self-disciplined man who goes steadily up the ladder of promotion.

The Navy education courses offer division officers many opportunities for the improvement and advancement of their men, and every division officer who adds a man to the list of those taking the educational courses adds something to his own value as well as to the increased efficiency of the man and of the Navy. The sum of little things like this may mount up to a surprising total. There is no surer proof of a division officer's capacity as a leader of men than the evidence of his ability to keep those who are under his command well occupied and interested in their work and ambitious for advancement.

Let every young officer who reads these lines ask himself the following question:

What are the advantages of an Honorable Discharge?

What are the requirements for an Honorable Discharge?

How many of your men were promoted last quarter?

How many tried for advancement and failed, and why?

What is the essence of every petty officer's obligation?

What is the schedule of punishment for the most common offenses; such as unauthorized absence for various periods, drunkenness and theft?

How many of your first enlistment men know this schedule?

What is the gist of the Oath of Allegiance, and what is its moral obligation?

What effect has conviction by a court-martial upon a man's service record marks for conduct, and in proficiency?

How many men in your division are qualified to date for Honorable Discharge?

How many of your men have no allotments registered, and why not?

If you cannot answer these questions and other questions affecting the welfare and efficiency of your men, look up the answers now. You cannot do justice to yourself or to your men unless these matters are at your finger tips and always in your thoughts when you are dealing with men. This is your "job"; the leadership of men.

The foregoing suggestions apply particularly to new men serving in their first enlistment, because they do not understand naval discipline and life in the Navy; nor do these new men clearly understand the reasons which underlie all orders and Navy Regulations, or the rewards and privileges which come from a clear record and for proficiency.

Napoleon said that every private soldier of France carried a Marshal's baton in his knapsack. Every first enlistment man in the Navy should be made to feel that the stars on his collar may some day be worn on his epaulets. To give him this feeling; to inspire subordinates with interest, pride, zeal and a desire to rise; to hold the standards of performance always higher, and to take as many of his men as possible over the high bars without a stumble or fall; but to put them all over with records reasonably clear: This seems to be the essence of the "the job" of the division officer in our Navy.

Merchant Marine Personnel and Navy Interest

(SEE WHOLE NO. 239, PAGE 71)

LIEUTENANT F. V. GREENE, U. S. N. R. F.—I have read, with interest, the article on the Merchant Marine and its relation to the Navy, by Captain F. E. Cross, U. S. N. R. F., published in the January PROCEEDINGS. It called forcibly to my mind certain facts which have an intimate bearing on the subject.

The Naval Reserve, as we know, is very necessary to the Navy in time of war, to man ships that are in excess of the number which can be manned by our Navy; and the members of the Reserve should be able to earn a living at sea in the way they have been used to.

With the reduced size of the Merchant Marine, this is difficult, but it is made even harder by a prejudice which exists in many steamship lines against having American-born officers. In one line I have in mind, very few Americans will be found among the officers; and in the higher ranks, none at all.

The officials of the Company explain this by saying that American-born and trained officers are incompetent and cannot handle their ships or their machinery. All this is not only very unjust, but is entirely contrary to facts. It results, however, that this preference for foreigners throws many Americans out of employment. They are cut off from earning their livelihood on the sea, lose their touch with it, and with seafaring life in general. Thus, there is lost to the American Merchant Marine that class of American-born officers who would be so valuable if another war should come about.

In the late war, many un-naturalized aliens were commissioned in the Naval Reserve Force; and *after* being so commissioned, were taken down and naturalization papers taken out.

As a sidelight on the desirability of this situation, it is a well-known fact that many of these foreign officers ridicule the United States and its institutions; they believe, or affect to believe, that it is nearly impossible to get American-born and trained officers for the U. S. Navy in case of emergency (although there are many such who are qualified in every way); and they think it a great joke that the Navy is unable to fill up its ranks without having recourse to foreigners.

In the next war, the Navy will again need the help of a great number of seafaring officers. Will it always be able to draw these from the ranks of foreigners?



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GREAT BRITAIN

THE NEW BATTLESHIPS.—Washington, February 16.—Full recognition of the increasing menace to surface warships of aerial attack is given by the British in plans for the two new battleships, the *Nelson* and *Rodney*, according to information just received through official channels.

Not only will the upper deck be heavily armored against aircraft bombs and dropping shells fired from long range at high angles, but two other decks, one at the top and the other at the bottom of main armor belt alongside, will furnish additional protection. These three armored decks, British experts believe, will furnish adequate protection against overhead attack to the ships' "vitals."

Not content with protective measures of this sort the accepted designs for the new ships provide for a quarter-deck unusually large and free from obstructions which will probably be used for airplanes to land on and take-off from. In addition provision will be made for carrying seaplanes as well so that the new fighting craft will in effect be a modified airplane carrier able to meet an air attack in the air independent of the fleet's additional air forces.

Latest detailed information about these "treaty battleships" shows that when completed within the next three years, England will have the most powerful fighting ships afloat. Original plans drawn for the proposed super-*Hoods* of pre-conference days have been utilized, construction experts bending their energies to cutting down the weight to the prescribed 35,000 tons, without losing offensive or defensive power, and without sacrificing more than absolutely necessary the speed factor.

The main batteries will consist of nine 16-inch guns as against the eight 16-inch guns of the *West Virginia* and *Colorado* our two battleships that are nearing completion. These guns will be mounted in three

turrets all forward. Two of them will be on the forecastle one firing above the other and the third just forward of the funnel leaving practically no astern fire but keeping the after deck space available for aircraft. The three turrets as well as the conning tower, will be heavily armored.

While the reduction in engine power to save weight will leave the new ships with a speed of about 23 knots, the engines will be oil burning, driven by turbines with reduction gears, giving them a greater cruising radius than any other British battleship, enabling them to operate more readily in the Pacific and in remote waters.

The contract price of these vessels is about six million pounds each, a sum considerably in excess of the cost of our latest warships. Taking into consideration the comparative cheapness of British labor, this sum will enable the constructors to use the best of material thus effecting great savings in weight, and to incorporate every modern improvement.

They will be 660 feet long, slightly larger than ours, and will have a secondary battery of twelve 6-inch guns and four anti-aircraft guns, with 21-inch torpedo tubes on the upper deck in triple tube installations. Hydraulic operation of the turrets and steering gear is provided for and the bulges for torpedo protection will be within the hulls.

The big guns will be the largest ever used in the British Navy, the biggest previously being the 15-inch guns on the *Hood* during the war. The new guns are modeled along the lines of those in our Navy and weigh about 130 tons each. Work on the guns, armor and the ships themselves is under way.—*United Press*.

THE NEW BATTLESHIPS.—Of course, the greatest interest of the month, as far as the British Navy is concerned, is the laying down of three ships, the two battleships allowed under the Washington Agreement and the mine-laying cruiser being built at Devonport Dockyard. At first, it was generally believed that the two capital ships would be modified *Hoods*, with several of the features of that super-ship sacrificed in order to keep their displacement within the 35,000 tons allowed, but now it appears to be practically certain that they will be battleships pure and simple. Of course, all details discussed are purely conjectural, for the Admiralty is still in favor of the policy of keeping all new ships very secret in spite of the lead set by the United States, but of all the numerous prophesies of their details which have been published—and their names is legion—the one which finds most favor with the service man is that they will have a displacement of 35,000 tons, a huge beam into which have been worked wonderful devices for protection against under-water explosion, a speed of twenty-three knots and an armament of nine sixteen-inch guns in triple turrets.

Presumably these turrets will be arranged two super-firing forward and one aft, just as they have been in earlier British ships, but it is not without interest to read of one naval architect suggesting that all three turrets should be mounted forward, rising in a gigantic pile to the foretop and leaving the astern fire to a powerful battery of six-inchers or five-point-fives specially arranged for salvo firing. The argument is quite logical, that war experience showed that British ships were usually forced to use their bow guns far more than any others, and that if a ship is pursued and in danger of capture it only requires a knot or two to be knocked off the speed of the enemy to enable her to make her escape without difficulty. Salvos of six-inch shells seem more likely to open up the bow-plating of a pursuing ship and so retard her speed than sixteen-inchers fired in pairs, and, in this particular case, there appears to be quite a lot to be said for the medium caliber gun for fleet work, pro-

vided its range is long enough. On the other hand, the mental picture of three triple turrets rising one above the other until they emerge into the fore-top is too horrible to be contemplated by anybody who thinks that a ship should have some elements of beauty.—F. C. Bowen, in *Our Navy*, 14 February, 1923.

CRUISER-MINELAYERS.—Considering the striking results which attended the use of mines by every naval belligerent in the late war, the soundness of the Admiralty's decision to build a ship specially designed for mine-laying is not to be questioned. *H. M. S. Adventure*, constructing at Devonport, is the first regular mine-layer laid down for the Royal Navy, but she is not likely to be the last. During the war many ships of other types were improvised for mine-laying, including the two Canadian Pacific liners *Princess Irene* and *Princess Margaret*. The former blew up with terrible loss of life at Sherness, but her sister remains in the post-war fleet. She is of 5,070 tons, steamed 23 knots on trial, and carries 400 mines.

The monitor *M-31* has also been refitted for mine work, but her small dimensions, low speed, and limited capacity for storage disqualify her for anything but training or coast defense. Several of the destroyers equipped with mines during the war still retain their gear, and we have also a few submarine mine-layers. The credit for evolving the high-speed sea-going mine-layer belongs to Russia, which built the *Yenesei* and fitted out several auxiliaries for this purpose just before the war with Japan. The *Yenesei* committed suicide on one of her own mines, but not before some of the "eggs" she laid had taken heavy toll of the Japanese Fleet.

Greatly impressed by the rôle of the mine in this Far Eastern War, Germany proceeded to build improved replicas of the *Yenesei*. The *Nautilus*, of 1,970 tons and 20 knots speed, was launched in 1906, and the *Albatross*, a slightly larger and faster ship, a year later. The latter was disabled and driven ashore by Russian cruisers in July, 1915, on returning from a mine-laying expedition in the Eastern Baltic. In the second year of the war Germany laid down two small but very fast mine-laying cruisers, the *Brummer* and *Bremse*, which were among the ships surrendered at the armistice and subsequently scuttled at Scapa.

Beyond raiding a convoy they do not appear to have performed much war service, but the possibilities of the design were obvious, combining as it did a speed of some 31 knots with light side guns, and large storage space for mines. A ship of this type could be employed equally well for long-range mine-laying or ordinary light cruiser duties. Had Germany built more of these vessels and used them with greater boldness they must have caused serious embarrassment. From the particulars of *H. M. S. Adventure* which have been published in our columns she will apparently be a ship of great speed and good weatherly qualities. Even when a considerable percentage of weight has been deducted for mine storage—and the modern sea mine is rather a ponderous weapon—there should be an ample margin left over for mounting an armament much more powerful than that of the *Brummer*.

The post-war tendency in naval design is to equip a vessel for more than one branch of duty. For example, our latest light cruisers carry aeroplanes and a heavy torpedo armament, and the aircraft carrier *Hermes* with her powerful quick-firing battery, could hold her own in an artillery duel with an enemy cruiser. For service in the Narrow Sea a ship such as the *Adventure*, which is reported to have a displacement of 7,000 tons, would be needlessly large and expensive, but for operations oversea she represents an admirable type. What a mine-carrying ship of great steaming radius can do when working independently was demonstrated by the

German auxiliaries *Moewe* and *Wolfe*, which sowed their mines in areas far removed from the immediate war zone and caused us endless trouble. In our judgment, therefore, the building of the *Adventure* shows the Naval War Staff to possess more imagination and enterprise than it is usually given credit for.—*Naval and Military Record*, 10 January, 1923.

FRANCE

THE NAVAL PROGRAM.—Some complaint is being made of the delay in giving our orders to private shipyards in connection with the naval program comprising the construction of three cruisers of 8,000 tons, six destroyers of 2,400 tons, twelve torpedo boats of 1,460 tons, and six submarines of 600 tons, together with the transformation of the *Bearn* into a seaplane carrier. Private shipyards will build four destroyers and all the torpedo boats and submarines, but while work is being carried on actively at the arsenals, no contracts have yet been distributed amongst private builders, and it is complained that, apart from the utility of putting all the work in hand simultaneously, it is unfair to delay giving employment to men in the shipyards while those in the arsenals are specially favored. The official explanation is that the prices submitted by private shipbuilders are so much above the estimated costs that the Ministry of Marine cannot accept them without risk of incurring the displeasure of Parliament. At the same time no one knows what the ships are costing in the arsenals.—*The Engineer*, 2 February, 1923.

SUBMARINES AND COAST DEFENSE BATTERIES.—The French are throwing themselves heart and soul into the working principles of the *Jeune Ecole*, for which they have always had a taste since Gabrielle Charmes began his crusade in the eighties. At present it is their intention to build two big submarines of 2,700 tons submerged displacement, with high speed, big gun power, and general lines very much after the fashion of our own *K* type. Details of these ships are still lacking, but they will not be laid down until the latter part of this year at the very earliest, possibly not even then. One wishes the French luck in their experiment, but the experience gained by the Germans and ourselves during the war is that the construction of super-submarines is asking for a good deal of trouble and is likely to be so for some time to come until there is a radical change in design.

But if the French are running a certain amount of risk in the construction of submarines of under three thousand tons, what of the plan that has been put forward to construct a number of six thousand-ton submersible liners which are to be used for maintaining communication with the North African colonies in the most unlikely event of the surface of the Mediterranean being closed to French shipping? It is understood that the design of these ships has been prepared and is being considered by the ministry of marine, and bearing in mind the number of weird and wonderful designs that have been considered by the French Navy since the dawn of the ironclad era it is not by any means improbable. If they care to waste their time on this sort of thing it is presumably their business entirely, and, after all, it might produce some interesting scientific results, but few will consider that it has much chance in the realm of practical politics. The published idea is to use them as transports, but, working from the experience that was obtained from the blockade runner *Deutschland* and her trips to the United States, it would appear that the number of soldiers who could be carried across in this manner would be so small that, quite apart from technical difficulties in the matter of getting the ship to dive and handle properly, the experiment would certainly not be worth while.

Another interesting naval experiment of doubtful value that hails from France is the construction by the Naval Ordnance Corps of a very long range twelve-inch gun, which certainly "out Berthas Big Bertha" by streets. Details of the new weapon are still a trifle vague, but, apparently, the gun itself weighs ninety tons, while the heavy mounting brings the total weight up to well over two hundred. It will fire an eight hundred fifty-pound shell and will have a range of a comfortable fifty-five miles. There is not the least reason to doubt these details, for the French want a lot of beating when it comes to an engineering feat of this sort. They are going to mount these pieces in coast defense batteries to work in conjunction with the fleet of submarines which they may or may not build. The Germans bombarded Paris with their Big Bertha and did a good deal of moral and material damage, but they never quite knew where their projectiles were going to drop, and a city is a very much easier target than a fast raiding man-of-war, or even a fleet of transports. A range of fifty-five miles is a great advance in naval gunnery, but, at the same time, it is rather difficult to see what good the new gun is going to be for coastal work; if the French mounted these pieces on their inland frontiers it might be different.—F. C. Bowen in *Our Navy*, 14 February, 1923.

SUBMERSIBLE BATTLESHIPS.—The French Ministry of Marine now have under construction a submersible vessel of 6,000 tons displacement. She is really intended for the conveyance of troops between France and North Africa terrain in the event of hostilities, and should the Mediterranean be controlled by enemy craft. She will have accommodations for a battalion of infantry with all necessary supplies.

The biggest underwater vessels thus far completed were the German blockade runners of the *Deutschland* type. They had a submerged displacement of rather less than 3,000 tons, and were able to cross the Atlantic very comfortably, either on the surface or running for many hours under it, on their fuel endurance. Our own biggest submarines are the *K* cruisers, which are nearly 1,000 tons smaller. The disaster to *K-5* two years ago gave rise to an impression that these boats were too big to be maneuvered with safety. But whilst there seems little reason to doubt that this unhappy craft collapsed under heavy pressure resulting from diving too deep, this was due not to any architectural defect, but to miscalculation or the temporary failure of controlling equipment.

No Limitations

The building of the French submersible, more than double the size of anything yet attempted in the way of submarine construction, serves to remind us that there is really no more limitation to dimensions than in the case of the surface craft. In the course of an address to the naval architects of the United Kingdom not very long after the conclusion of the war, Sir Eustace d'Eyncourt, speaking of the principles which had governed his design of the *Hood*, said that the submersible battleship was a perfectly feasible idea, but not worth while.

By this, of course, the Director of Naval Construction meant that the sacrifice of swift capacity to attack and resist, and the necessary compromise in armaments, armor, and propelling machinery, would so far place the submersible battleship at a disadvantage with the surface ship as to more than outweigh the ability to disappear. In reference to the traditional methods of sea warfare this is probably correct. But we are now in an era when new forms of fighting have to be reckoned with, and these may altogether negative the precept laid down by Sir Eustace d'Eyncourt four years ago.

The war of the future will be largely dominated by two factors which were in comparatively initial stage during the Great War. These are

aircraft and gas. I use the words "comparatively initial," because in no previous campaign had these methods been employed, and not with any idea of minimizing the devastating efficiency which had been attained in their use before the conclusion of hostilities. In military circles it is frankly preached that the next big war will be a chemical war. There is not wanting evidence that the Admiralty believe a similar condition may extend to sea warfare.

Gas Warfare at Sea

Within the next few months an entirely new anti-gas equipment will be issued to the fleet, and leading ratings of "superior ability" are invited to volunteer for instructional courses up to the full numerical capacity of the anti-gas school. Now it does not need much effort of imagination to realize that the employment of gas projectiles—either in the form of shells or bombs—against a warship is fraught with very much more serious danger than in the case of open land fighting. For the poisonous fumes, permeating the fighting stations and general quarters of a vessel, would be a new and terrible form of peril to the normal risks of a naval action.

The ability to submerge would be the easiest and most effective antidote to such a menace. Indeed, submersion would probably be often unnecessary in the case of a ship able to do it, since she would obviously be hermetically sealed, and therefore gas proof so far as her interior was concerned.

Eluding Air Attack

Submersion as a means of eluding aerial attack may be regarded as of rather questionable value, since from an altitude of several thousand feet the shape of a hull under water would be discernible. But even so, a vessel some fathoms deep would form a very much more difficult and indeterminable target than a ship on the surface. As against this, of course, it is true to say that she could not employ her anti-aircraft weapons of defense.

It is probably too much to claim that a submersible battleship would be immune from submarine attack, since the submarine would work under the direction of aerial spotters. But that the risk in this way would be greatly reduced is beyond question. Periscope observation of a hull on the surface is a very different thing from blindly obeying wireless instructions.

The advantages of the submersible battleship, it will be observed, are all of the defensive order. Now defensive qualities, essential as they are in a ship-of-the-line, should form a secondary consideration to aggressive powers. These would undoubtedly have to be sacrificed in no inconsiderable degree in a vessel designed to plunge at will. One consequence of such a development would certainly be a great reduction in displacement. The British *K* boats, with their single 12-inch guns, are practically battleship monitors. Their precise tactical rôle with the fleet has never been defined, possibly because it is of too indefinite a character. Manifestly there are so many conceivable conditions under which the sudden appearance of a vessel armed with even a single heavy caliber weapon might prove a decisive factor that it is virtually impossible to determine limits to her uses.

Problems Ahead

Submersible battleships should prove of the utmost value in operations undertaken at a long distance from home bases. A squadron that could approach its objective unseen, and therefore unsuspected, might have every prospect of success, where a surface force would be merely

courting disaster. That heroic phrase, "The Nelson touch," is still occasionally used, but the submarine, the destroyer, the aircraft, and the mine combine to render such tactics in nine cases out of ten merely suicidal. Jellicoe showed a clear perception of this when he broke off the Battle of Jutland at nightfall.

The pause in the competition of sea armaments which has been brought about by the Washington Agreement is bound to have revolutionary effects upon big warship design. The problematical influence of aircraft attack and chemical warfare will have advanced a long stage along the road of practical determination before the great naval Powers resume the building of capital ships. That these factors will eliminate the capital ship altogether only a very small minority of professional opinion believes. But that they will profoundly modify the traditional ideas which are still embodied in her form seems reasonably certain. And the submersible battleship is very likely to be one of the expressions of the change.—Sir Herbert Russell in *Naval and Military Record*, 31 January, 1923.

THE NAVAL BUDGET.—I. If nothing intervenes, the Chamber will soon take up the Naval Budget, which is next in order on their calendar after that of the Beaux Arts. Discussion of the bill on naval arsenals has already given occasion for the Minister of Marine to set forth the broad lines of his naval policy. In the coming years the task of the Minister of Marine will be if not easy at least fairly simple. The war has left France without a navy and one must be created.

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8. Here is the right place to economize rather than on the things that make for comfort of the men, which still leaves much to be desired on board some of our ships. Life on board the ex-German cruisers is uncomfortable. They were built for short cruises in the North Sea, upon return from which the men rested in spacious barracks. Day and night we keep hundreds of men in narrow quarters where tuberculosis may thrive.

9. Likewise it were imprudent to seek to curtail the expense of sending men on leave. Our naval forces are concentrated in the Mediterranean. It is not right to expect men from Brittany to pay their own expenses to their homes on leave. We must not forget that re-enlistments are rare.

10. The Navy needs trained men, specialists. Propaganda films, introduced by M. Raiberti, should be shown in all schools in France. The effort made by the Ministry to organize the preparation of service in the fleet is not enough. The naval apprentices of the Navy League are too few. We should show the young men of our industrial centers, electricians, carpenters, and coppersmiths, the advantages of pay and career open to them on board our ships.

11. Vessels are building, but slowly. Credits made available for the naval program in 1922 have not been used. This is not economy; it is rather delay. The main thing is not today's navy, but tomorrow's. Ships in service today have hardly any use other than for the training of personnel. Technically the French Navy should be the first in the world. The naval school to be built in Brest for the tidy sum of 5,300,000 francs will, we hope, possess laboratories and scientific collections. The greatest scientists are available to the Navy, but money is lacking for science. In 1920 the English budget for scientific research amounted to ten millions; ours to a paltry million. Through the genius of Langevin, Pousset, Becquerel, Perine, Holweck, Trillat and many others, the French

Navy was the first to discover taking soundings by means of sound waves (the application of which could have saved the *France*), the secrets of distant mechanical transmission of power microphones, etc., but because of our poverty we were unable to apply them.

12. More even than material means, we lack clear and sane ideas. For instance we see millions wasted on dirigibles. Valuable for ocean traffic, they are possessed of all the virtues except ability to flight. The War Department has given them up. The Navy still believes in them. Has the latter forgotten the serious losses in Zeppelins experienced by Germany, and the recent admission by Commander Strasser in the *Marine Rundschau* (April, 1922), he being the chief of the dirigible service. In 1918 dirigibles passed their apogee; planes, the remarkable organization of English artillery made their attacks so difficult that only on very rare occasions were satisfactory results accomplished by the dirigibles. On August 10, 1918, the *L-Z-76* was brought down in less than an hour by a plane. Tomorrow every light cruiser will carry planes. Hereafter the average altitude for fighting planes will be 8,500 meters, while that for dirigibles is 8,000; and the latter makes only 120 kilometers per hour as against the planes 250 km. Once overtaken the dirigible is an easy prey, doomed to disaster. The Naval Committee was quite right in refusing to buy or build a successor for the *Dixmude*; it has cost too much already.

13. Other expenses are pressing; soon the whole fleet will be burning oil. We lack storage and tankers. All large foreign navies have made extensive experiments in launching bombs from aircraft onto ships under way. On their point Parliament has no right to hesitate; our Navy does not own a dozen modern naval planes. And in submarines we are no better off. For years to come we shall be well within the figures which our friends deigned to allot us in Washington. Certainly the Minister did well to include in the 1923 Budget a first credit of three and one-half millions for the study and production of a motor of 5,000-6,000 h. p. During a long period of years the Germans spent millions of marks on motors, which all but won the war for them.

14. Renovation, both administrative and intellectual, scientific research, construction of an air fleet and a submarine fleet, those are the essential tasks. The 1923 Budget is a step on the way; but is still all too modest.

—*Le Temps*, Paris, 13 December, 1922.

FRENCH NAVY NOTES.—The French decision to altogether give up battleship-building will have as natural counterpart a gradual strengthening of the French submarine fleet which the wear and tear of war and the absence of practically any new construction since 1914 have had the effect of considerably weakening. Submarines are essentially fragile; ten years form the limit of useful longevity for most of them, especially those under 600 tons. In Admiralty circles it is estimated that of the fifty submersibles on the active list of the Navy less than half are worth relying upon for a prolonged campaign. Since the War Gallic constructors have been taught by hard experience to be extremely exacting in the matter of submarine robustness, both in what concerns hulls and motors. Boats surrendered by the Boches have been sometimes derided by our ingenieurs on account of their coarse workmanship, but at least they had one quality sterling in war: viz., they were made to stand rough and prolonged usage at sea. At the present moment there is in commission a total submarine displacement of 30,000 tons, of which only 10,000 tons are considered to be available for warfare on the high sea. Building there are 11,000 tons, projected there are 12,000 tons (voted by the Chamber), and 35,000 tons are besides contemplated so as to make up

within a decade at most 65,000 tons of ocean-going submarines, in addition, of course, to 25,000 tons smaller submarines for coastal duties, making altogether 90,000 tons.

During the last few years the submarine problem has been the object of methodical and persevering attention, by means of laboratory researches and comparative experiments, and as a result the latest French submersibles of 1,100 tons, especially the *Joessel* and *Fulton*, have proved satisfactory in every respect, realizing an advance in the matter of reliable and economical propulsion, and also of habitability, over the best German-built submarines now in French hands. Creusot-Carrel motors of 1,500 horsepower have proved a gratifying success, especially when are remembered grievous disappointments experienced with former French-built Diesel motors before and during the war. The *Fultons* do 16 knots at sea with ease, and are good for a 11,000 miles radius, and with their eight torpedo tubes and their ten torpedoes of 18-inch diameter, plus two 75-mil. guns, they would prove dangerous opponents. The *Callot* and *Chailley*, just completing (932-1,300 tons, 3,000-horsepower, four bow tubes, thirty mines), mark a further progress. This complete mastering of the submarine motor problem means the opening of a new era in French submarine developments.

Post-war tests and war data combined led Paris experts to the belief that fighting qualities, habitability, radius of action, together with robustness and durability, require a minimum displacement of 1,200 tons, and regret is expressed at the inclusion in the Guist'hau program of smaller boats of 600 tons. The 1,200-1,500-ton submersible will probably be the standard French under-water type for years to come (3,000-horsepower, 16 knots, eight tubes of twenty-two inches, twelve torpedoes, 7,000 miles radius of action, fuel and stores for a thirty-day cruise). For experimental purposes two boats of 2,700 tons are to be put in hand next year, to have speed and gun power as well as a powerful torpedo armament. Colonial defense is what submarine designers have at heart to ensure—a thorny matter indeed over which discussion is raging in competent quarters. Safe communications to be maintained with Algeria, Senegal, Congo, Madagascar by means of 3,500-ton submersible cargo boats, and of 6,000 submersible liners, for which plans are ready by Ingenieur Simonnot and others. Since France can lay no claim to the mastery of the surface, under-water and aerial communications must at least be ensured to her. The successful experiment of the *Mediterranee* dirigible over and round Corsica have revived the demand for naval dirigibles.

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The 8,000-ton *Primaugute*, *Dugaury-Trouin*, and *Lamotte-Piquet* are steadily proceeding toward the launching stage at Brest and Lorient, but owing to belated improvements the motors have only just been ordered at St. Nazaire and at La Seyne. The total horsepower at forced draught will exceed 116,000, and the speed ought easily to reach 35 knots. Care has been taken to increase the all-around robustness so as to beat all actual records in the matter of cruiser sea speed.

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France's ballistic proficiency is attested by the batteries of extremely powerful and otherwise efficient 18-inch guns that will command this spring her most important strategic passages and approaches to her main naval bases. These weapons, that are vastly superior to any type of gun afloat and have maintained the French lead for shell destructiveness, possess, of course, naval value on account of their range, high velocity, and accurate fire, especially since the patient researches and combined experiments by *canonniers* and *officers d'artillerie navale* have solved the

problem of night firing, with both Admirals Salaun and Lequerré have been for months past studying with such will and method. To this substantial advantage for caliber the new 230-ton 340-mil. monster gun, just delivered by the Ruell naval gun factory, is adding superiority of range, as this French experimental "Bertha" will fire a 600-kilos shell at distances exceeding seventy-five kilometres (forty miles)—twice the range of ordinary naval guns—but with a degree of accuracy far superior, it is expected, to that displayed by the Boche supercannon that bombarded Paris. The qualities of the steel and thickness of the new gun, shortly to be tried at Gâvres, make it certain that the range could be safely extended. The question of wear and tear alone limits the trial range. The projectiles are, besides, for use on land.—J. B. Gautreau in *Naval and Military Record*, 17, 24, and 31 January, 1923.

GERMANY

RECORD GERMAN SHIPBUILDING.—The measure of our ignorance as to what progress Germany has really made toward the recovery of her economic strength since the war is indicated by some figures just published in Brassey's *Naval and Shipping Annual* on the authority of Sir Westcott Abell, Chief Ship Surveyor of Lloyd's Registry. Until lately it was quite impossible to obtain accurate statistics concerning the output of new tonnage from German yards owing to the secretive methods practiced there. It was known, of course, that those establishments were hard at work, but the revelation of what they have done is positively astounding. Sir Westcott Abell is now in a position to announce that the German shipyards in 1921 turned out no less than 1,714,300 tons gross, as compared with 135,000 tons in 1919 and 440,000 tons in the last pre-war year, and the total production for 1922 is believed to be as large as, if not larger than, that of 1921. Before the war German's shipbuilding capacity was estimated at half a million tons per year. In view of the supposed chaotic condition of her financial and industrial system since the war it would have been sufficiently remarkable had she been able to build anything like as much as this today. In fact, however, she has contrived to more than treble her pre-war rate of production.

Now, as shipbuilding is an expensive business, even when labor charges are low, this gigantic output of new tonnage proves that Germany, notwithstanding her plea of poverty, has plenty of cash to spare for everything but reparation payments. Apart from that question, Sir Westcott Abell's disclosure makes it perfectly clear that Germany is well on the way to becoming our most formidable competitor both in shipbuilding and sea traffic generally, and will soon be pressing us much harder than the United States is ever likely to do. Moreover, this enormous expansion of her shipbuilding resources means that Germany, when free to reconstruct her shattered naval power, will be potentially more dangerous than she was before the war. Her capacity for producing, say, submarine tonnage is now at least thrice as great as it was in 1914. The idea that Germany will remain indefinitely a negligible factor in the naval situation is, therefore, quite illusory.—*Naval and Military Record*, 10 January, 1923.

GERMAN NAVAL PROGRESS.—Since the reduced German naval and military forces were brought, on grounds of economy, under a single authority, the Ministry of National Defense, it has become almost impossible to ascertain how the funds voted were distributed between the two branches. Together, in 1922, they absorbed 6.40 milliards of paper marks, which were officially reckoned to have an external value of (at 1:70) of 91,420,000 gold marks (approximately £4,571,000). The same services

cost, on the estimates of 1914, 1,879,000,000 gold marks (nearly £93,950,000). In a comment on the whole Budget, Dr. Arnold Brecht, a director in the German Home Office, refers to the enormous shrinkage of expenditure on the Army and Navy. He compares the total outlay with the British outlay on the Air Service, which he sets at over £10,000,000, and with the relatively enormous expenditure of England and France. He adds that the cost of the Armies of Occupation is to Germany yearly 1.6 milliards of gold marks, being approximately £80,000,000. These are Dr. Brecht's figures. His object is to show how little Germany can do for her own defenses and how much she is compelled to pay for the maintenance of other armies. The most really useful work of the German Navy last year was in the training cruises of the *Berlin* with young officers and men, first to Swedish waters, and afterward through the Kattegat and Skagerack to visit the Norwegian coasts and ports. The ship's company were reported to have profited by the experience and to have shown much seamanlike quality.—*Army, Navy and Air Force Gazette*, 27 January, 1923.

JAPAN

BUDGET AND PERSONNEL.*—The Japanese Budget for the next fiscal year is freely criticized by the Press as "militaristic," owing to the large proportion of expenditure which it allots to defense. Out of the total estimated disbursements of 1,350,000,000 yen, army appropriations exceed 200 millions, and naval costs amount to 286 millions, these two items together thus accounting for more than thirty-five per cent of the total. Economists point out that the reduction of the Army Estimates by forty-seven millions is due less to actual retrenchment in that service than to the withdrawal from Tsing-tau, by which measure over twenty millions have been saved; and a further nine millions is temporarily economized by postponing the purchase of new equipment, which will have to be acquired sooner or later. The reduction of naval expenditure is considered disappointingly small in view of the Washington agreement. A considerable portion of the sums saved by stopping battleship construction has been diverted to the building of smaller men-of-war. On the whole, however, the financial burden of defense has undoubtedly been lightened, for, while armaments absorb thirty-five per cent of the new Budget, the corresponding percentage in last year's Budget—framed before the Washington decisions were known—was as high as forty-nine per cent.

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One effect of the reduction in personnel consequent upon the scrapping of so many old ships will be to increase still further the preponderance of volunteers in the Japanese Navy. For some years now the percentage of volunteers has stood at seventy-five. Under the new scheme of retrenchment about 10,000 ratings are to be discharged, and the annual quota of conscripts will be considerably reduced, while voluntary enlistment is to continue at the present figure. At an early date, therefore, from eighty to eighty-five per cent of the personnel will be volunteers, and in a few years' time the whole Navy, it is anticipated, will be manned on a voluntary basis, with the exception of stewards and carpenters. Training methods have been much improved during the past year, and some of the money saved on new construction has been spent in bettering the facilities for drill and instruction in the shore establishments and training-ships. Larger appropriations have been made for gunnery and torpedo practice, anti-submarine and mining operations, and scientific research. It is claimed,

*Reports in the press indicate that the enlisted strength of the Japanese Navy on January 1, 1923, was about 65,500 men.—EDITOR'S NOTE.

therefore, that the future Navy, though numerically weak in comparison with the two leading fleets abroad, will be maintained at a higher standard of war-readiness than ever before. The elimination of the conscript element will also raise the average length of service, as volunteers enlist for six years, as against a three-year term for conscripts. Japanese naval authorities are known to be anxious to increase the period of service to eight years, and this will eventually be done if circumstances permit. Naval service is said to be as popular as ever, applicants for enlistment being sufficiently numerous to enable a high standard of intelligence, physique, and character to be maintained. Discipline has, if anything, improved of late years; the relations between officers and men leave little to be desired, and cases of insubordination are extremely rare.—Hector C. Bywater in *Naval and Military Record*, 17 January, 1923.

UNITED STATES

VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY—Progress as of January 31, 1923

Type Number and Name	Contractor	Per cent of Completion				Contract date of Com- pletion	Probable date of Com- pletion
		February Total	1, 1923 On Ship	January Total	1, 1923 On Ship		
BATTLESHIPS (BB)							
45 <i>Colorado</i>	New York S.B. Cpn.	95.6	95.6	95.1	95.1	.....	8/1/23
47 <i>Washington</i>	New York S.B. Cpn. ....	.....	.....	.....	.....	.....	Suspended
48 <i>West Virginia</i>	Newport News S.B. & D.D. Co.	87.5	86.4	87.	85.9	.....	9/1/23
49 <i>South Dakota</i> ..	New York Navy Yard ..	.....	.....	.....	.....	.....	Suspended
50 <i>Indiana</i>	New York Navy Yard ..	.....	.....	.....	.....	.....	Suspended
51 <i>Montana</i>	Mare Island Nvy. Yd. ....	.....	.....	.....	.....	.....	Suspended
52 <i>North Caro- lina</i>	Norfolk Nvy. Yd. ....	.....	.....	.....	.....	.....	Suspended
53 <i>Iowa</i>	Newport News S.B. & D.D. Co. ....	.....	.....	.....	.....	7/12/23	Suspended
54 <i>Massachusetts</i>	Beth. S.B. Cpn. (Fore River).....	.....	.....	.....	.....	7/12/23	Suspended
BATTLE CRUISERS (CC)							
2 <i>Constellation</i> ..	Newport News S.B. & D.D. Co. ....	.....	.....	.....	.....	.....	Suspended
4 <i>Ranger</i>	Newport News S.B. & D.D. Co. ....	.....	.....	.....	.....	.....	Suspended
5 <i>Constitution</i> ...	Philadelphia Nvy. Yd. ....	.....	.....	.....	.....	.....	Suspended
6 <i>United States</i> ..	Philadelphia Nvy. Yd. ....	.....	.....	.....	.....	.....	Suspended
AIRPLANE CARRIERS (CV)							
2 <i>Lexington</i>	Beth. S.B. Cpn. (Fore River).....	36.7	27.2	36.3	26.7	.....	Indefinite
3 <i>Saratoga</i>	New York S.B. Cpn.	29.3	26.8	28.9	26.4	.....	Indefinite
SCOUT CRUISERS (CL)							
4 <i>Omaha</i>	Todd D.D. & Const. Cpn.	99.4	99.2	99.3	97.7	8/1/21	3/1/23
5 <i>Milwaukee</i>	Todd D.D. & Const. Cpn.	99.	96.	98.9	95.8	12/1/21	5/1/23
6 <i>Cincinnati</i> ...	Todd D.D. & Const. Cpn.	90.8	87.1	90.3	86.8	7/1/22	7/1/23
7 <i>Raleigh</i>	Beth. S.B. Cpn. (Fore River).....	82.3	70.7	81.3	69.2	8/1/21	Indefinite
8 <i>Detroit</i>	Beth. S.B. Cpn. (Fore River).....	97.1	93.6	96.9	93.3	11/1/21	4/1/23
9 <i>Richmond</i>	Wm. Cramp & Sons Co.	97.7	95.5	97.4	95.	.....	5/1/23
10 <i>Concord</i>	Wm. Cramp & Sons Co.	92.	88.5	91.5	87.	.....	7/1/23
11 <i>Trenton</i>	Wm. Cramp & Sons Co.	68.	59.5	67.5	58.	10/1/21	Indefinite
12 <i>Marblehead</i> ...	Wm. Cramp & Sons Co.	54.	43.5	53.5	42.	1/1/22	Indefinite
13 <i>Memphis</i>	Wm. Cramp & Sons Co.	48.	36.5	47.	35.	4/1/22	Indefinite

Type Number and Name	Contractor	Per cent of Completion				Contract date of Com- pletion	Probable date of Com- pletion
		February 1, 1923 Total	On Ship	January 1, 1923 Total	On Ship		
AUXILIARIES							
Repair Ship No. 1	<i>Medusa</i> (AR1) Puget Sd. Nvy. Yd.	89.4	82.6	88.9	81.9	.....	Indefinite
Dest. Tender No.3	<i>Dobbin</i> (AD3) Phila. Nvy. Yd.	76.5	76.3	76.	75.8	.....	Indefinite
Dest. Tender No.4	<i>Whitney</i> (AD4), Boston Nvy. Yd.	66.1	59.4	65.9	59.2	.....	Indefinite
Sub. Tender No. 3	<i>Holland</i> (AS3) Puget Sd. Nvy. Yd.	21.5	5.5	21.5	5.5	.....	In definite

PATROL VESSELS

Gunboat No. 22..	<i>Tulsa</i> (PG22) Charleston Nvy. Yd.	89.6	82.	86.	78.9	9/1/23
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SUBMARINES

116 S-11.....	Portsmouth N. H. Nvy. Yd.	Comm.	1/11/23	98.1	97.9
117 S-12.....	Portsmouth N. H. Nvy. Yd.	96.5	96.	96.2	95.7	4/ 1/23
118 S-13.....	Portsmouth N. H. Nvy. Yd.	94.8	92.9	94.6	92.6	.....	Indefinite
123 S-18.....	Elec. Boat Co. (Quincy)...	98.6	98.6	98.6	98.6	7/1/22	10/-/23
124 S-19.....	Elec. Boat Co. (Quincy)...	Comm.	1/6/23	98.7	98.7	9/30/22	.....
126 S-21.....	Elec. Boat Co. (Quincy)...	98.2	98.2	98.2	98.2	10/30/22	5/-/23
127 S-22.....	Elec. Boat Co. (Quincy)...	98.6	98.6	98.6	98.6	10/30/22	9/-/23
128 S-23.....	Elec. Boat Co. (Quincy)...	98.5	98.5	98.5	98.5	11/30/22	9/-/23
129 S-24.....	Elec. Boat Co. (Quincy)...	97.9	97.9	97.9	97.9	11/30/22	5/-/23
130 S-25.....	Elec. Boat Co. (Quincy)...	98.	98.	98.	98.	11/30/22	6/-/23
131 S-26.....	Elec. Boat Co. (Quincy)...	97.5	97.5	97.5	97.5	12/30/22	6/-/23
132 S-27.....	Elec. Boat Co. (Quincy)...	97.6	97.6	97.6	97.6	12/30/22	7/-/23
133 S-28.....	Elec. Boat Co. (Quincy)...	97.5	97.5	97.5	97.5	12/30/22	8/-/23
134 S-29.....	Elec. Boat Co. (Quincy)...	97.5	97.5	97.5	97.5	1/30/23	8/-/23
x136 S-31.....	Elec. Boat Co. (San Fran.)	.....	.....	.....	.....	1/30/23	2/20/23
x137 S-32.....	Elec. Boat Co. (San Fran.)	.....	.....	.....	.....	2/28/23	2/10/23
#139 S-34.....	Elec. Boat Co. (San Fran.)	.....	.....	.....	.....	2/28/23	3/10/23
#140 S-35.....	Elec. Boat Co. (San Fran.)	.....	.....	.....	.....	3/30/23	4/10/23
141 S-36.....	Elec. Boat Co. (San Fran.)	99.5	99.4	98.8	98.6	9/20/22	2/15/23
142 S-37.....	Elec. Boat Co. (San Fran.)	96.	95.	95.1	94.1	10/10/22	4/15/23
143 S-38.....	Elec. Boat Co. (San Fran.)	97.5	97.	96.5	96.	10/30/22	3/15/23
144 S-39.....	Elec. Boat Co. (San Fran.)	87.7	85.3	87.7	85.3	11/19/22	Indefinite
145 S-40.....	Elec. Boat Co. (San Fran.)	85.4	82.5	85.4	82.5	12/29/22	Indefinite
146 S-41.....	Elec. Boat Co. (San Fran.)	87.6	85.2	87.6	85.2	12/29/22	Indefinite
153 S-42.....	Elec. Boat Co. (Quincy)...	92.2	86.5	91.9	84.8	5/15/23	.....
154 S-43.....	Elec. Boat Co. (Quincy)...	93.4	88.5	93.2	87.	6/15/23	.....
155 S-44.....	Elec. Boat Co. (Quincy)...	90.2	82.	89.9	81.1	6/15/23	.....
156 S-45.....	Elec. Boat Co. (Quincy)...	91.1	83.5	90.7	82.2	7/15/23	.....
157 S-46.....	Elec. Boat Co. (Quincy)...	89.5	80.4	88.7	79.1	7/15/23	.....
158 S-47.....	Elec. Boat Co. (Quincy)...	89.	79.6	88.5	78.7	8/15/23	.....

FLEET SUBMARINES

163 V-1 (SF4)...	Portsmouth N. H. Nvy. Yd.	36.8	36.4	35.1	34.6	.....	Indefinite
164 V-2 (SF5)...	Portsmouth N. H. Nvy. Yd.	31.	.....	30.9	.....	.....	Indefinite
165 V-3 (SF6)...	Portsmouth N. H. Nvy. Yd.	31.	.....	30.9	.....	.....	Indefinite

Authorized but not under construction or contract:

Destroyers—(12) Nos. 348 to 359 inclusive.

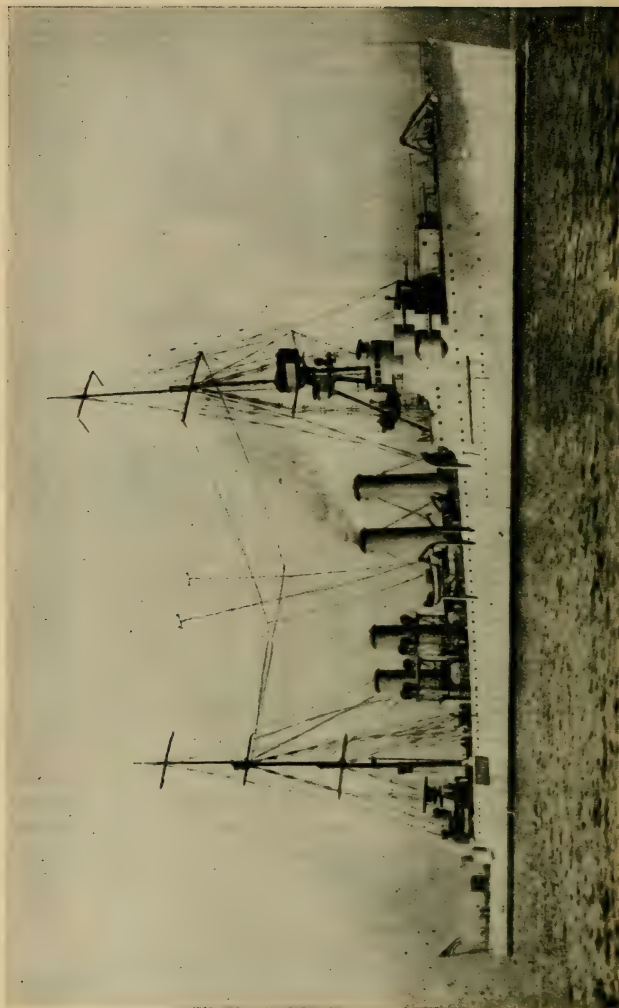
Transport—(1) No. 2.

Fleet Submarines—(6) Nos. 166-171.

Neff Submarine—(1) No. 108.

Hull complete—Engineering work only.

x Hull complete—Engineering work being completed at Groton, Conn.



Scout Cruiser "Omaha"

TREATY TO GOVERN WARSHIP REFITTING.—Plans of the navy department to modernize thirteen dreadnaughts could be carried out only after it had been determined that no violation of the naval limitation treaty would be involved, under a provision of the omnibus naval bill approved today by the House by a vote of 48 to 3.

As approved by the House the provision of the bill says:

"Subject to the terms of the treaty providing for the limitation of naval armament. . . . the Secretary of the Navy is authorized to incur obligations to the extent of \$6,500,000, to be paid as appropriations may from time to time be made for such materials and work as may be necessary for increasing the elevation and range of the turret guns of the following named battleships:

Florida, Utah, Arkansas, Wyoming, Pennsylvania, Arizona, Oklahoma, Nevada, New York, Texas, Mississippi, Idaho and New Mexico.

As originally proposed the provision would have authorized the alterations to the ships without any reference to the treaty, but Chairman Butler of the Naval Committee offered the substitute to meet objections of members that a violation of the treaty might be involved.—*New York Times*, 17 February, 1923.

TRIAL RUN OF U. S. S. "OMAHA."—Washington, D. C., February 27.—The U. S. Navy Trial Board will convene on January 30 at Tacoma, Wash., to supervise the preliminary acceptance trials of the scout cruiser *Omaha* highest powered vessel ever built for the U. S. Navy.

The *Omaha* was built at the plant of the Todd Shipyards Corporation and is the first of ten vessels of her type to be ready for her tests. The trial run will be over the Vashon Island course in Puget Sound and will last over a period of six hours.

These new cruisers are comparatively a new type, at least as regards steaming radius and high speed. The most noticeable features of the designs as compared with contemporary navies are their high speed of 35 knots, their displacement of 7,500 tons and their batteries of twelve 6-inch guns. They are practically exaggerated destroyers, for with a beam of 55 feet and a mean draft of 13 feet 6 inches, they are 556 feet in length overall, giving a ratio of beam to length of one to ten.

A remarkable feature of the *Omaha* is the enormous power of the four Westinghouse turbines that propel her. When operating at full capacity, these engines will develop a total of 90,000 horsepower. Never before, on land or sea, has so large an amount of power been installed in so small a space. The turbines of the *Majestic*, the largest steamship in the world, develop 100,000 horsepower, but the *Majestic* is nine times larger than the *Omaha*; while the *Olympic*, which is seven times larger than the scout cruiser, is propelled by engines of only 60,000 horsepower.

However, the *Omaha* needs 90,000 horsepower only when she is tearing through the water at the express-train rate of 35 knots, or forty-two miles an hour. For ordinary cruising speeds of from 12 to 15 knots, a few thousand horsepower is amply sufficient. In order to avoid operating her big engines at so small a fraction of their rated capacity, four small cruising turbines are provided. These cruising turbines can be coupled to the propellers when desired and drive the ship at the low speeds with excellent steam economy.

An interesting novelty, at least in the United States Navy, is the adoption for the first time of the tripod mast, at the head of which is located a closed director-fire position, from which the fire of the battery of twelve 6-inch guns will be controlled. A second battery will consist of two 3-inch fifty caliber aircraft guns and two three-pounder saluting

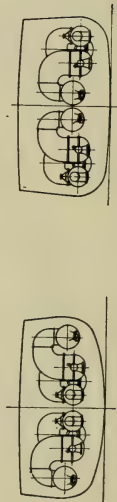
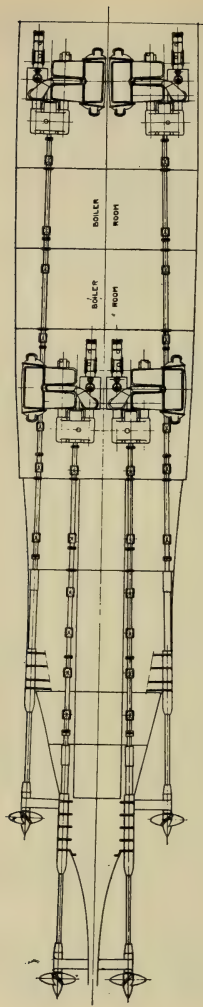


Diagram of Westinghouse Turbine Propelling Machinery for
U. S. S. "Omaha"

guns. The vessels will carry two 21-inch twin torpedo tubes, which will be located on either beam on the main deck between the aftermost funnel and the main mast.—Printed in *New York Times*, 28 January.

"SEATTLE" TO BE FLAGSHIP OF UNITED STATES FLEET.—The cruiser *Seattle* has been officially designated as flagship of the United States Fleet under command of Admiral Hilary P. Jones. The *Seattle* is being fitted out at the Puget Sound yard and officers and crew of the *Connecticut* now going out of commission there will take over the new ship. Quarters for the admiral and his staff and additional radio facilities and boat storage are being added. The ship will sail for the south April 1 to join the fleet. The ship will be used as an administrative flagship as the *Columbia* was used before taken back by the shipping board.—*The Naval Monthly*, February, 1923.

REPORT OF ARMY COMMITTEE ON STRENGTH OF NATIONAL GUARD.—The Secretary of War has approved the report of the Committee called for the purpose of studying the question of National Guard strength.

* * * * *

That the present approved plan for the organization of the National Guard is sound in principle and that the development of the National Guard under the plan and the approved policies of the War Department by the Militia Bureau is proceeding in a satisfactory manner, subject to the limitations imposed by funds appropriated by the Congress and by the States.

That taking into account the financial and economic situation now confronting the States and the United States, the maintenance cost of various strengths, and the amounts heretofore appropriated and that may be appropriated in the near future by the States and by the United States, it is necessary and in the best interests of all concerned, that the further development of the National Guard within the United States should be predicated upon a minimum peace strength of 250,000.

That the strength above indicated is the minimum that should be considered or that will permit the National Guard to accomplish its mission in the National Defense as contemplated by law and in War Department policies and plans. The strength indicated should be reached as soon as practicable and certainly not later than June 30, 1926.

That sound principles of organization and plans for the employment of the National Guard on mobilization in the event of a national emergency demand that whatever strength is maintained, that it be organized and developed into a homogeneous, well balanced and effective force, to the end that upon mobilization it may be employed as such without reorganization, or changes in character of units. The strength above indicated, 250,000 men, will permit of the maintenance of the following organizations within the United States, which should be developed in the order of priority stated:

- (a) *At peace strength*, subject to modifications as shown below:
 1. Eighteen Infantry Divisions.
 2. Four Cavalry Divisions.
 3. One hundred thirty Companies Harbor Defense Troops.
 4. Twelve Infantry Regiments, Special Allotments.
- (b) *At maintenance strength*, subject to modifications as shown below:
 1. The combat elements of Corps, Army and G. H. Q. Reserve troops now organized or in the process of organization.
 2. Special allotments to States.
 3. Certain units necessary to complete a balanced force.

MERCHANT MARINE

THE SHIP SUBSIDY BILL.*—Washington, February 16—The Administration Shipping bill was restored tonight to its former place as the unfinished business of the Senate, after having been laid aside since early in the week to allow consideration of the British debt settlement legislation. This was done on motion of Senator Jones of Washington after advocates of the measure had demonstrated their superior strength by voting down, 38 to 30, a motion by Senator Robinson of Arkansas to adjourn.

The vote on adjournment was not regarded as an accurate test of the strength of the forces supporting and opposing the Shipping bill, as several Senators on both sides were absent.

Although the future of the subsidy bill in the Senate has not been clearly indicated in the face of claims and counter-claims on the possibility of its passage, it was said at the White House today that President Harding would not call a special session of Congress to consider the merchant marine situation if the Shipping bill should fail.

Mr. Harding was said to feel that the necessity for action looking to a solution of the shipping problem had been clearly demonstrated, and to have reached the decision that if the Shipping bill is not enacted the Government will proceed at once to take such steps as will diminish in a very great degree the present losses of the Government's fleet.

Detailed reports on the operation of Shipping Board vessels, showing net losses on individual voyages running as high as \$100,000, had been studied by the President and his advisers, it was said, and the consensus of opinion was that the losses would be wiped out under the necessary economics which would follow the return of the shipping to private ownership.—*New York Times*, 17 February, 1923.

"NATIONAL SECURITY AND DEFENSE OF OUR COUNTRY."†—The usefulness of a Navy to a nation is not limited to the actual time of hostilities, but exists in time of profound peace because of its restraining influence on nations which respond only to force.

As an instance of the futility of merely setting an example, I cite the condition of our Merchant Marine. To take up this subject may seem a digression, but it is not since the Navy and the Merchant Marine are so dependent on each other as to constitute one element of the nation's power.

I do not wish to be considered as in any way criticizing but I would like to give you a plain sailorman's point of view of the condition of our Merchant Marine and then leave it to you to judge. The act under which our Merchant Marine is struggling was written by an able and well-known statesman from Wisconsin with the president of the International Seamen's Union sitting at his elbow. The avowed object of the latter gentleman was to raise the standard of living of sailors of the world—by our example—with what result?

On June 30, 1914, just before the outbreak of the World War, there were only 1,066,000 gross tons of American shipping registered for foreign trade, out of a total tonnage of 7,928,000 gross tons in the American Merchant Marine—all but these register ships being engaged in coastwise commerce. These 1,066,000 gross tons of shipping registered for foreign commerce were in 1914 carrying only 9.7 per cent in value of that commerce. On June 30, 1922, the American tonnage registered for

* Opponents of the Bill established a filibuster which finally killed this important legislation without its ever having been voted on.—**EDITOR'S NOTE.**

† Abstracts from an address delivered by Admiral Hilary P. Jones, U. S. Navy before the National Republican Club, New York, on 20 January, 1923.

foreign commerce, including the war-built vessels of the Shipping Board, amounted to 10,720,451 gross tons, carrying 34.6 per cent of our commerce.

But it should be borne in mind that since the end of the war there has been a steady decline in the proportion of American imports and exports conveyed in American vessels—the figures being 42.7 per cent in 1920, 39.8 per cent in 1921 and 34.66 per cent in 1922—that is, in the fiscal year ending June 30, 1922.

That is to say, the American participation in our country's own carrying trade, which reached a maximum of 42.7 per cent in 1920, is now falling at a rate that will very soon leave us as weak and helpless on the ocean as we were in 1914, unless some vigorous measures are taken to prevent it.

We are at a disadvantage in three points—(1) Our foreign sea-carrying competitors are in possession of the field, with organizations of their own all over the world; (2) all foreign governments in some form to some degree, subsidize their shipping—either all of it or a part of it—and aid their vessels also in other ways by discrimination against their competitors; (3) American ships, as a rule, pay substantially higher wages and provide more and better food for their officers and seamen than do foreign ships. That is to say, on American ships both wages and subsistence costs are greater than on foreign ships of the same kind, in the same trade. The wage cost of the crew of an average American cargo ship is 40 per cent more than the wage cost of a British ship of the same tonnage and general character. This difference in wages alone, to say nothing of subsistence, amounts to about \$1,000 a month, or \$12,000 a year, or 4 per cent on the capital cost of a 10,000 deadweight ton cargo steamer purchased from the Shipping Board at a rate of \$30 a deadweight ton—the price now obtainable.

As to the seamen's law of 1915, it does impose certain discriminations against American ships from which their competitors are free. But that law does not in itself make American ship wages higher than foreign ship wages—for American ship wages were just about as much higher than foreign wages before 1915 as they are now.

The La Follette law has tended to weaken discipline on American ships and been more harmful than it has in any increase in the American wage rate. Contrary to a popular impression, the La Follette law does not require that a certain proportion of the crews of our ships be American citizens. It does require, however, that 75 per cent of the crew in each department shall be able to understand the language of the officers.

Another provision of the La Follette law provides that no men shall have the rating of able seamen unless they have been at sea three years on deck. This is a longer period than is necessary, and the requirement itself in effect discriminates against young Americans in favor of foreigners—as was doubtless intended by the International Seamen's Union, which brought about the enactment of this law, for of the members of this union at that time fully 90 per cent were foreigners.

Of the personnel of our merchant marine, 47 per cent in the overseas and long-voyage coastwise trade now represents American citizens, native or naturalized—the native Americans heavily predominating. This, however, includes the officers below the rank of master.

Of our actual seagoing merchant marine in the overseas and ocean coastwise trade on December 1, 1922, 1,966 vessels, of 5,826,000 gross tons, were of private ownership, and 1,642 vessels of 7,429,000 gross tons, belonged to the Shipping Board. In this Shipping Board fleet, however, a large amount of defective tonnage not of present commercial value

is included—so that probably the privately-owned and the government-owned tonnage of our actual serviceable seagoing fleet are practically equal in amount.

SEA TRAINING.—In this issue of *The Nautical Gazette* Professor Sukawa, of the Imperial Government Nautical College of Tokio, contributes an exceptionally important paper on the sea training of officers for the merchant service of Japan.

The following points are of special interest to us:

Ten local nautical institutes are maintained by the provinces—each independent and supported by appropriations of the provinces and by students' monthly fees.

There are two Government nautical colleges.

Course in the institutes six years, three ashore, three afloat.

Course in the colleges, four years.

Optional naval training in the institutes.

Required naval training in the colleges.

The insistence on training in both sail and steam.

The recognition of higher training by commissions in an established naval reserve.

Boys from all parts of Japan have a competitive chance for such sea training.

It may be of interest to compare the systems of training at present in being in the United States.

Three schoolships, small craft approximating a thousand tons displacement. Supported jointly by the Federal Government and the States of Massachusetts, New York and Pennsylvania.

These schools rank about equally with the institutes in Japan. The course is two years as against six in Japan.

We have no higher merchant nautical training schools.

All American boys do not have a chance to go to a nautical schoolship.

This privilege is reserved to boys who reside in the States of Massachusetts, New York and Pennsylvania.

If a boy residing in New Jersey, for instance, desires training for the sea, he is barred from the schools. The same, of course, holds good throughout the other States not in possession of schoolships.

We have no similar naval reserve provision to encourage those taking schoolship training.

The three American schoolships *Newport*, *Nantucket* and *Annapolis*, are doing excellent work and schoolship graduates hold an honorable position in our merchant marine, but the present facilities are inadequate, the training is too short, and the opportunities for training are too limited.

Shipowners, underwriters, and all other far-sighted Americans must be concerned in this matter. If we are to continue at sea successfully we must provide for sea training available to American boys from all parts of the country.

The present number of graduates from the schoolships are not sufficient to fill the vacancies in the lower ranks under normal conditions. It is a credit to our native ability that we do so well in spite of our lack of systematic sea schooling.

Concise and authoritative information, such as that given us by Professor Sukawa, is of the greatest value.

Every nation of Europe devotes patient effort to the training of officers and seamen for their merchant fleets. Great Britain has eighteen schoolships, Germany has eight. The more important countries of South Amer-

ica have schoolships for naval and reserve officers where their future commanders are educated. The whole tendency of this system is to create a body of men having expert nautical knowledge, useful either in the pursuits of peace or the business of war.

Not only do the schoolships of all nations teach navigation, but languages and a special academic course designed to fit graduates for intercourse with the peoples of the world. These graduates emerge with a training that places them far above the mental level of the old-time ship's officer, who steered in accordance with a system of navigation that may have been effective but which could only be learned by the hard route from fo'castle to a master's cabin.

American boys of today who have the mental equipment desired in an officer should be given an equal opportunity to adventure and to do service on the sea. It may be expected that the new generation of American ship officers will be a credit and an asset to the flag.—*National Gazette*, 27 January, 1923.

UNITED FRUIT FLEET CONVERTED TO OIL BURNING.—With the conversion of the steamships *Santa Marta* and *Zacapa*, now in progress at the plant of the Robins Dry Dock and Repair Company, the United Fruit Company will complete its program of converting all steamships operating out of the Northern Divisions from coal to fuel oil burners.

The United Fruit Company's fleet equipped for burning oil by the Todd Shipyards Corporation includes the following vessels: *Toloo*, *Calamares*, *Pasores*, *Tivives*, *Carrillo*, *Metapan*, *Santa Marta*, *Zacapa*, *San Jose*, *San Mateo*, *Limon* and *Esparta*.—*Nautical Gazette*, 10 February, 1923.

ENGINEERING

THE MARINE DIESEL ENGINE.—At the beginning of 1923 we are faced on every side with evidence of the increasing importance of the marine internal combustion engine, which we do not hesitate to say will prove a dominating factor in British marine engineering of the future. If marine engineers were slow to appreciate the early developments of the internal combustion engine this new form of prime mover to the propulsion of sea-going vessels, it cannot be said that such development has been neglected in recent years. In the years immediately prior to 1914, and throughout the war period, advances were made, especially in the building of the submarine type of engine, which familiarized many engine builders with the peculiar difficulties of marine oil engine practice. Since 1918, the greatest progress has undoubtedly been made in the construction of standard engines for cargo ships. The motor liner of moderately large power is now an accomplished fact, and we are already within sight of the large naval vessel propelled by internal combustion engines. The interest and enthusiasm for the marine oil engine and the problems inseparably connected with its design, construction and operation are well reflected in the papers which are read before the technical institutions. This is particularly noticeable in the case of the institutions immediately associated with the engineering and shipbuilding industries on the Tyne and Clyde.

The first meeting of the North-East Coast Institution of Engineers and Shipbuilders this year was devoted to a review of different types of marine internal combustion engines, and the Council of the Institution is to be congratulated on the response made by various engine builders and the variety and completeness of the schemes put forward for discussion. It was perhaps hardly to be expected that one particular size of cargo vessel would fit in equally well with the standardized production of every engine builder, but altogether seven schemes were submitted,

and with the exception of two noted types of four-cycle engines the list is complete. The difference in type is marked, for two designs of four-cycle machinery, three designs of two-cycle machinery, and two opposed-piston engines are represented. With the exception of the Vickers proposal the horsepower of the engines are singularly equal; they do not vary more than from 1 to 2 per cent, and the machinery weights show a corresponding regularity. In general, the saving in weight compared with a similar steam engine installation appears to be about 15 to 17 per cent. The familiar cylinder ratio between the two-cycle and four-cycle types is apparent, the former type of engine requiring only four cylinders, and the latter six cylinders for a given output. With the Doxford proposition the number of cylinders is reduced to three, but the weight and size of the engine is not very different from that of the other types. The cylinder diameter varies from a minimum of 21-in. up to 29-in. and the relation of bore to stroke approaches in some cases the 1:2 ratio which has been so successfully used in Scandinavian cargo ships fitted with Burmeister and Wain type engines. These long-stroke engines are now also built by Harland and Wolff. Throughout, a comparatively low speed of revolution is retained, and the speeds vary from ninety-five to 112 revolutions per minute, ninety-five revolutions being the mean. The question as to the overload capacity of the engine has in most cases been answered, and the two opposed-piston engines and the Scott-Still engine are most favorable in this respect. In the latter case the assistance of the steam side of the cylinder is very clear, and is shown in the high mechanical efficiency—88 per cent—which is claimed. The 82 per cent for the Doxford engine is a remarkable good figure, and so is the 78 per cent given for the Vickers engine. In most other cases a more conservative figure varying from 73 to 75 per cent is given. Turning to the fuel consumption, here again striking equality is shown, the figures given only varying between 0.386 lb. and 0.43 lb. of oil per brake horsepower-hour for the main engines alone. When the auxiliaries are added a wider difference is noted, but this in many cases is explained by the difference in the size and powers of auxiliaries put forward. Several makers have availed themselves of the opportunity of including a scheme with electrically operated auxiliaries. In most cases the weights for the steam and electric schemes are about equal, but it is safe to say that the cost of the electrical equipment is much higher. Where a donkey boiler is installed there is a marked tendency to use steam turbine-driven blowers and pumps. This is perhaps only natural considering the familiarity of the seagoing engineer with such machinery, but it behooves the electrical manufacturer to meet the demand for a high-speed marine type of motor, especially for turbo-blowers. In the case of the Armstrong-Sulzer proposal, we note that in the scheme with electric auxiliaries the scavenge pump is arranged on the main engine to avoid the necessity of fitting a high-speed motor-driven scavenge blower. It is stated that at the present time some difficulty is being experienced in connection with a British-built motor of this particular type. There is little doubt that this question will be dealt with in the discussion of the review. A point of interest is raised by the replies given to the question of using boiler fuel oil continuously. Although experiments have shown that there is no real difficulty in burning heavy oils of this type over prolonged periods, there is certainly great danger of pistons and liners becoming scored by particles of ash and of deposits forming, which for their removal will entail more frequent overhauls and attention. This is a matter which might well engage the attention of oil companies, with a view to removing these detrimental qualities from standard fuel oils. A matter affecting the shipbuilder and the registra-

tion societies is the revision of the rules for the size of machinery space to obtain the reduction from the gross tonnage. The diminution in engine room length is particularly noticeable in the Scott-Still scheme, where the difference between the length required and that shown on the standard drawing is about seventeen feet.

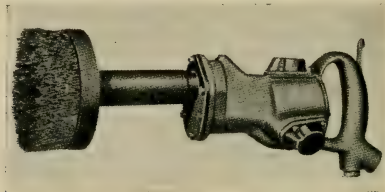
Speaking generally, the schemes put forward augur well for the future of the British motor ship. The Camellaird-Fullager engine and the Doxford, Vickers and Scott-Still engines owe much to British inventive genius and capacity for working out designs to a successful issue, and other makers, availing themselves of continental help, have influenced their adopted designs in the direction of conformity to the recognized high standards of British marine practice. Whilst naturally we feel some regret that in many cases British makers are still not only employing foreign designs, but are even dependent upon foreign firms for the supply of certain parts, it is made abundantly evident by this Review organized by the North-East Coast Institution that our own ship-builders and marine engine builders are now attacking the matter with energy, and we are inspired with the hope that before many years are past our reliance on foreign designers and builders will cease, and that Great Britain will lead in the construction of internal combustion marine engines as she has long done in steam marine engines and turbines.—*The Engineer*, 19 January, 1923.

DIESEL DRIVE FOR WARSHIPS.—A great deal has been written about the advantages offered by the Diesel engine from the naval point of view, but we have not hitherto come across any definite project for installing such machinery in the larger types of fighting ships. The fact that so far it has been fitted only in auxiliary vessels may be taken as evidence that in its present stage of development the Diesel engine is not adapted to the propulsion of large, high-speed ships. Not until the power capacity of the individual cylinder has been increased considerably beyond the present maximum will the internal-combustion motor replace steam machinery in major men-of-war. On the other hand, progress in this direction may be sufficiently rapid to make the Diesel-driven battleship a feasible proposition in the course of a few years.

In his paper read before a technical society in Scotland last week, Engineer-Lieutenant-Commander L. J. Mesurier, R. N., dipped into the future by forecasting a naval vessel equipped with Diesel engines generating 40,000 b. h. p. through four shafts. There would be four sets of 8-cylinder engines, so that each cylinder would have to realize 1,250 b. h. p. It is understood that cylinders of that power have already been built for experimental purposes, but none has been put on the market up to now. An output of 40,000 b. h. p. is equivalent to about 50,000 i. h. p., which would drive a 35,000-ton ship at approximately 23 knots. As Lieutenant-Commander Mesurier explained, a Diesel-driven warship would have increased radius of action on a given supply of fuel, ability to go to sea on short notice, and to increase rapidly from cruising to full speed. Moreover the absence of uptakes and funnels would confer advantages in disposition of armament and increased protection.—*Naval and Military Record*, 24 January, 1923.

NEW HIGH-SPEED BRUSH FOR CLEANING METALLIC SURFACES.—Where very large surfaces, as in the case of steel ships or other metal structures such as bridges, have to be cleaned of rust, dirt or paint, the cost of hand methods of cleaning is a very large item. With the object of providing more rapid and economical mechanical means of cleaning such surfaces, the Ingersoll Rand Company, Ltd., of 165, Queen Victoria St.,

London, E. C. 4, have recently brought out a high-speed, air-driven wire brush which gives promise of considerable utility. Experiments have shown that a wire brush rotating at a high speed not only cleans metallic surfaces more effectively, but actually stands up to the work with less wear than when revolving at lower speeds. The machine in its entirety weighs only fourteen pounds, and this very desirable feature has been obtained by the provision of an aluminum casing into which steel bushes have been cast. Its overall length is about seventeen inches, and the maximum speed of 4,200 revolutions per minute is comfortably obtained when the air-supply pressure is ninety pounds per square inch. This



High-speed Wire Brush

brush has been used with highly successful results on ship work and also for the cleaning of rough iron and steel castings. The quality of the work is stated to be better than that usually effected by hand agents, and a substantial saving, both in time and in labor, has been accomplished.—*The Shipbuilder*, February, 1923.

NEW ELECTRIC FERRYBOAT "POUGHKEEPSIE."—The ferryboat *Poughkeepsie* which is now in operation between Poughkeepsie and Highland on the Hudson River, is undoubtedly the most remarkable craft afloat. She is one of the first commercial vessels to be propelled by electricity; she is the first Diesel-electric ferry to be put into operation; she is the only Diesel-electric-gearred vessel in existence! she is the first to be constructed with a hullfin; and she has been especially designed to act as an ice-breaker. Because of this unusual combination of unique features, she has attracted a great deal of interest in the shipping world. She was completed in September, 1922, but at first was not able to make her required speed. This difficulty has been overcome, however, and she was recently placed in regular service.

As originally designed, the propeller motors, which operate from 600 to 720 R. P. M., maximum, were connected directly to the propeller shaft. It was not possible, however, to obtain full speed with the 48 x 26-inch propellers then used. Messrs. Tams and King were retained as consulting engineers to correct this trouble, and at the suggestion of their Mr. A. B. Raymond, herring-bone gears, giving a three and one-fourths to one reduction, were installed between the motors and the propeller shaft, and 60 x 60-inch, semi-steel Keerfott propellers, to operate at about 220 R. P. M. were substituted for the original ones. The result of these changes was the gain of about forty-five per cent in the *Poughkeepsie's* speed, so that she now runs at about nine miles per hour. Normally both motors and both propellers are operated so as to give ample power and eliminate the drag due to the forward propeller, but either motor or either propeller can be cut out if desired.

The *Poughkeepsie's* propelling machinery consists of two 125-H. P.

Winton Diesel engines, each of which drives a 90-K. W. Westinghouse generator, which in turn furnish power to two 100-H. P. Westinghouse motors geared to the propellers. There are several reasons why this form of drive was adopted. The most important is its high fuel economy.

There is every reason to believe that the *Poughkeepsie* can develop a brake-horsepower per hour on less than a half a pound of oil, whereas she would certainly require over a pound of oil to develop the same amount of power if she had the most efficient form of steam engine. In addition, she has no standby losses whatsoever. Consequently, when sufficient data is accumulated it is fully expected that the daily fuel cost of the *Poughkeepsie* will prove to be about one-third of that required by a steam-operated vessel of similar power and hull size.

Another advantage is the compactness of the machinery. It can all be contained within the hull without a superstructure, leaving the main deck perfectly clear and providing room for four lines of automobiles in addition to the passenger cabins on either side. The *Poughkeepsie's* car capacity is therefore practically double what it would be with steam propulsion.

Finally, the pilot has absolute control over the movements of the vessel. By merely moving a small handle located behind the wheel in each pilot house, he can start, stop, reverse or change the speed of the boat without the loss of an instant's time or the slightest opportunity of having his signals misunderstood. So agile is this control that the *Poughkeepsie* can be brought from full speed ahead to full speed astern in less than a minute.

To look at the *Poughkeepsie*, she appears to be broad, shoal, and of very light draught. This is not the case, however, for under her visible hull is a second one, known as the "hullfin," which is a long and narrow stream-line projection, like an enlarged keel. It contains the propeller motors, gears and shafting, and carries the propellers at its ends. Its chief purpose is to place the propellers under the boat, where they are always immersed in solid water. It also enables the *Poughkeepsie* to act as an ice breaker. Instead of wedging into the ice, as a boat with a standard hull will do, the broad end of the *Poughkeepsie* rides over it, crushes it, and then pushes it aside. The position of the propellers on the hullfin prevents them from being injured during the process. No very heavy ice has been encountered in the river so far this winter, but it is expected that the *Poughkeepsie* can keep in operation with even the maximum thickness of ice, which sometimes exceeds two feet at this point.—*Nautical Gazette*, 10 February, 1923.

BARGE SEPARATING OIL FROM BALLAST WATER.—The Oil in Navigable Waters Act, 1922, which came into force on January 1, has been responsible for the production of a separator barge, designed from the experience gained as the result of experiments carried out at Smith's Dock Company on the separation of scum from ballast water. The barge has been produced in conjunction with the Anglo-Saxon Petroleum Company, in order to obviate the necessity for a vessel having to proceed beyond the three-mile limit to discharge ballast water. The principle of operation is that of the surface separation of liquids of different specific gravities, the liquid having the lighter specific gravity rising to the surface. The barge is divided into a number of compartments by transverse bulkheads, the first being a receiving compartment. From this the liquid passes into another compartment, provided with a series of cones and baffles, while the bulkheads between the remaining compartments are arranged to form cascade filters. From the receiving compartment the oily water enters the cone filtering compartment, where practically all

the scum is trapped by means of an intensive system of cascading and baffling, consisting of a number of superimposed cones terminating in the form of a bottle neck. The function of this is to reduce the free area of the scum which rises to the surface. When this accumulates in sufficient quantities in the bottle neck, it overflows into the scum trays surrounding the filter cone top and drains from there into the scum storage tank. The remainder of the ballast water passes on through the cascade filter compartments, which are made up of a number of transverse bulkheads extending from side to side of the barge, each having a horizontal slot at the top, and bottom alternately, the slots running the full breadth of the bulkheads. The compartments are partially closed at the top, by a sloping plate, which consists the free surface as much as possible, so that the scum which may rise to the top is accumulated on a relatively small area instead of on a large one. By this arrangement the thickness of the scum floating on the surface of the water is increased and rendered more removable. The barge is fitted with a Hayward-Tyler pump, which can draw from the river, from the filter compartments, or from the scum storage tanks, and deliver to a deck connection, from which there are two branches, one leading to the filter compartment and the other delivering ashore. It is found that the scum does not seriously extend beyond the fourth cascade opening, and can then be dealt with by hand. Heating coils, fitted in the storage tank, allow the scum being heated and settled. The separated water is pumped from the bottom of the tank through the cone filter until practically nothing but pure oil remains. This can either be delivered back to the ship or ashore, as desired. Some successful trials were carried out with the oil tanker *Corbis* recently, and many authorities expressed themselves satisfied with the barge's performance.—*Marine Engineer and Naval Architect*, February, 1923.

AERONAUTICS

ARMY PLANE WITH EIGHT GUNS.—An airplane equipped with eight machine guns and capable of firing approximately 5,000 rounds, was tested at Kelly Field yesterday. The plane is the first that has ever been equipped with so many machine guns, officers said. Previous experiments have been made with four guns. The results of the test were highly satisfactory.—*Boston Evening Transcript*, 6 February, 1923.

DISPERSAL OF CLOUDS AND FOG.—Rainfall has been caused and clouds have been made to disappear in a series of experiments which are being conducted here at McCook Field, according to announcement made today by the experimenters, Professor Wilder D. Bancroft, of Cornell University, and L. Francis Warren. The successful experiments were made with the co-operation of the army air service.

In brief, the clouds were made to disappear and precipitate their moisture by the dropping of electrically charged grains of sand upon them from airplanes.

Professor Bancroft and Mr. Warren claim that the process will be of great value in the commercial world, as fogs over cities, harbors and flying fields can be made to disappear, thereby insuring safety to travel and transportation. They do not claim that in every instance rain or precipitation can be produced, as they say all clouds do not contain sufficient moisture.—*Baltimore Sun*, 12 February, 1923.

ENGLAND'S WONDER AIRCRAFT.—In the light of certain very remarkable developments which have recently taken place in aircraft construction, the whole of the Government's air policy is, it is learned from an authoritative source, being reviewed, and experts are already engaged in

the drafting of the new policy, which is to be submitted to the Cabinet at an early date, so that the increased expenditure may be included and covered in the Budget which is to be presented to the House of Commons in the spring.

It is already certain that there will be a very considerable increase in the number of machines to be constructed in the coming financial year.

The far-reaching character of these epoch-making developments was unfolded yesterday to a Press representative by one of the foremost authorities in the aircraft industry. He said:

"The new type of machines which, during the past two years, has been experimented with under conditions of the greatest secrecy has more than demonstrated the immense possibilities of the future. If, unhappily, in the near future, war should come, the enemy will find Britain prepared and possessing wonder machines the like of which have never been dreamed of in the realms of cold fact. We are, indeed, at the moment ahead of all other nations."

One of the main objects of the designers has been to give the machines an increased climbing power. Experiments have shown that with the old type of machine known in the service, adjustments can be made which increase the climbing power from 20,000 to even 40,000 ft. All the new machines are being made with increased climbing power.

Another important development is in the direction of producing the silent aeroplane. The Air Ministry already possesses engines which are to all intents and purposes silent, and experiments which have already been carried out recently at Farnborough have proved the feasibility of producing a silent propeller, so that in the very near future the actual silent aeroplane for bombing work is more than a possibility.

Torpedo-carrying aeroplanes are being developed for work at sea, and the Air Ministry have in commission a large number of these planes which can carry large-type torpedoes. In the main the torpedo-carrying aeroplanes are to be housed in the newly-commissioned floating aerodromes. These machines can rise almost vertically from the deck of a warship, swoop down on their prey, discharging torpedoes at short range, and return to the floating aerodrome, alighting on the deck slowly without any danger to the widespread wings.

The planes possess a speed of upwards of 140 miles an hour in the air, and can swoop down to the deck of the parent ship, reducing their speed on the downward glide.

Great strides have been made in perfecting the fighting machine, and the aeroplane of the future is likely to be constructed from special-hardened steel in the place of wood.

The two all-metal machines which came from Germany to this country recently, and were described as being the very last word in aircraft, were, it is definitely stated, behind in many highly-important details the all-steel machines which we own. Troop-carrying planes, capable of transporting twenty-five to thirty men, by which a small army of men, well equipped, could be suddenly landed at any desired spot, are also being built. The plane carrying 1,000 men or more is yet a dream of the future. "Hush, hush," has been the policy of the Air Ministry, throughout the experimental stages.—*Naval and Military Record*, 24 January, 1923.

ANTI-AIRCRAFT GUNS BRING DOWN TARGETS.—Galveston, Tex., February 20—The anti-aircraft problem the Sixtieth Anti-Aircraft Battalion worked out over Fort Crockett last night was described by Major General Edward M. Lewis, commander of the Eight Corps Area, as among the best he had seen.

Amid the glare of six searchlights, five throwing beams of three billion candlepower, and one smaller, four kites were towed high in the night air, across the line of fire, and demolished, one after another, by two sections of machine guns, each containing three guns.

Two kites were cut loose from their strings, and floated to the ground amid a hail of bullets, while the other two were so badly hit that they could not fly. Tracer bullets, the paths of which could be plainly discerned by all spectators, were used in the firing.

After the demolishing of the kites fourteen tiny hydrogen balloons were released from unknown positions about the field. As fast as each balloon was picked up by the rays of the searchlight, it was peppered with shots. Two of the balloons were demolished at the first shot, an unusual feat of marksmanship, according to General Lewis.—*Boston Evening Transcript*, 20 February, 1923.

ORDNANCE

DESTROYERS TO USE DIRECTORSCOPE.—With the coming southern maneuvers, the directorscope for destroyer firing will be used for the first time in action in the U. S. Navy. The eleventh and twelfth destroyer squadrons have been drilling with the new device for the past two months and are now ready to take it into action. The directorscope enables destroyers to fire salvos from all guns which can be brought to bear upon a given target.—*The Naval Monthly*.—February, 1923.

MORE RANGE WITH NEW BULLET.—Work of Army experts since the war has produced a new bullet for use in rifles and machine guns which is expected to add enormously to the effectiveness of these weapons in any future conflicts. The new bullet is known as a "boat-tail" because of a six-degree taper at the tail. Exhaustive tests have shown that the change in shape has added 1,400 yards to the maximum range and flattened the trajectory or arc of flight at 1,000 yards approximately thirty per cent. The Army experts have worked out a new jacket for the bullet that virtually eliminates fouling the gun barrels. It is a ninety per cent copper and ten per cent zinc composition that leaves the rifling clear of clogging metal and will increase the accuracy life of rifles and machine guns. It also will permit accuracy with small arms to be as great in combat as in peace time target work.

Tests at the arms infantry school have fixed the maximum range of the new bullet at 4,800 yards as compared to 3,450 yards with the present ammunition. It also has been demonstrated that at 600 yards with the new ammunition it is possible to put every shot into a circle the size of a teacup as the "boat tail" is less subject to wind current deflection.—*Boston Evening Transcript*, 29 January, 1923.

RANGE OF GERMAN SUPER-GUN PUT AT 132,000 YARDS.—Army statistics credit the German super-gun that pounded Paris during the war with a range of 132,000 yards, as compared to the 30,000 yard maximum range of the American 14-inch naval guns. The German projectile for which figures are given, however, was 8.26 inches in diameter and weighed only 264 pounds, as compared with the 1,400-pound, 14-inch monster used in the American gun.

The report describes the German gun as constructed "from wornout 15-inch, 45-caliber naval guns, mounted on concrete emplacements."

"The converted guns," it adds, "were of two parts; the main section was 98.5 feet long, and the forward section 19.7 feet. The 15-inch gun was bored out and a heavy, uniformly rifled tube 8.26 inches in diameter inserted, 42.3 feet of this tube projecting beyond the muzzle of the gun. Over this projecting portion a hoop was shrunk.

"The muzzle section, 83.6 feet in length, was screwed to the end of this hoop tube. This forward tube was unrifled and was probably added to impart additional lineal velocity and better align the axis of the projectile with that of the bore of the gun."

The super guns could be rebored twice, first for 9.3-inch projectiles, and again for 9.93-inch missiles. One of the guns which fired on Paris, seven of which had been constructed in all, had been thus rebored, the report said.

Compared with the American 14-inch naval gun, the German super-weapon was 118.2 feet in length against 59.7 feet; developed 467,250 foot-tons muzzle energy against 85,750; weighed 318,000 pounds, against 180,395; had a muzzle velocity of 4,760 feet per second, against 2,800; maximum elevation of fifty-five degrees, as against 38 degrees, and had an accuracy life of fifty rounds, as compared to 250 rounds for the American gun.—*Washington Post*, 15 February, 1923.

NAVIGATION AND RADIO

To SURVEY CUBAN GULF.—The *Hannibal*, with several auxiliary craft, has sailed for Cuban waters to continue surveying the Gulf of Batabano and the Isle of Pines, the Hydrographic Office announced tonight.

The *Hannibal* had installed before sailing a sonic depth finder such as are used in studying the bottom of the Pacific Ocean to determine the cause and effect of earthquakes.

In addition to the *Hannibal*, the expedition consists of two sub-chasers, one seaplane, two specially fitted 500-ton steel barges with living quarters and five forty-foot sounding boats.

The personnel of the *Hannibal* has been increased by 105 officers, hydrographic surveyors, draughtsmen and enlisted men.

Survey of this area is important to the navy on account of the naval base at Guantanamo.—*New York World*, 29 January, 1923.

PREVENTION OF STATIC.—Prevention of static interference in the reception of radio signals has been solved, it is stated, by an invention of Dr. B. Galen McCaa, of Ephrata, near Lancaster, Pa., U. S. A. Two different systems have been developed, and in California this summer a static of 6,000 audibility was reduced to five, at which time commercial signals were received at 250 times the strength of the static. The second system has produced results superior to those obtained in California. Tests have been made with the latest scheme at 360 m., on which a broadcasting system is operated, and it is known that the device will operate on all radio systems at any wave lengths. The latest device is free from critical adjustments, and is absolutely stable in operation, requiring no attention. The fact that it operates on an aerial makes it applicable for use on ships at sea, and becomes another important factor in life-saving by assuring absolute communication between vessels in conditions in which they cannot now operate.

A series of experiments in Transatlantic radio telegraphy was recently completed in South London by members of the Radio Society of Great Britain, the organization formerly known as the Wireless Society of London. The object of the experiments was to show the practicability of communication between this country and America on a far shorter wave length and much lower power, and with a much smaller, less complicated and expensive aerial than are used by the official and commercial stations. The experiments were made on ten successive days, from December 22, with apparatus installed at the base of the chimney on the premises of the County of London Electric Supply Company at Wandsworth. The aerial consisted of six wires on a hoop 5 ft.

in diameter, fitted to the chimney, 170 ft. high. The maximum wave length used throughout the ten days was 200 m., and the maximum power 1.5 kilowatts. The call number of the station was 5 W.S. These successful experiments were a unique achievement for British amateurs. Official and commercial stations, when communicating with America and other distant countries, use wave lengths of from 15,000 m. to 30,000 m., and power from 250 to 350 kilowatts. The tests impressed the authorities, who had been inclined to doubt their usefulness ever since the society first contemplated making them, nearly a year ago.—*The Engineer*, 19 January, 1923.

MISCELLANEOUS

ITALY RATIFIES THE TREATIES.—With only scattered votes of disapproval, the Italian Chamber has ratified the treaties negotiated last year at the Washington Conference. The treaties approved include the agreements for the limitation of naval armament, for the restriction of the use of submarines and noxious gases in warfare and for the settlement of certain Far Eastern questions. The action of the Italian Chamber leaves France as the only one of the signatories to the treaty for the limitation of naval armament that so far has not ratified last year's agreement. Advices from Paris indicate that the French Parliament will ratify the treaty in the near future, and the approval of the Italian Chamber was no doubt given with the tacit assumption that ratification by the French Chamber would soon follow.—*Boston Evening Transcript*, 10 February, 1923.

FRANCE TO RATIFY NEXT.—Paris, February 8—The treaty for the limitation of naval armament signed at the Washington Conference will be presented shortly to the French Parliament with a recommendation for ratification, but with the understanding that the limitations on French armament should not be accepted as establishing a principle. A report to this effect has been nearly completed by Charles Guernier, who was recently empowered by the foreign affairs commission of the Chamber of Deputies to put the commission's ideas in draft form.

The Chamber will be asked to adopt a resolution to the effect that, inasmuch as the Root resolution prohibits submarines from attacking merchantmen, the latter class of vessels should be defined and should be forbidden from arming. A member of the commission explained that France was willing to ratify the treaty because she would be unable for financial reasons to exceed its limitations during the life of the treaty, at any rate.

Some expression against the establishment of the principle of naval limitation is regarded as necessary, as it is considered certain France would not subscribe to the same restrictions after the expiration of the accord in 1936.

The report, which was drafted after thorough discussion in the commission, is believed to represent the sentiments not only of the commission but of the Government. It includes a reservation similar to that adopted by the American Senate, designed to leave France free from obligations to any armed co-operation. The reservation reads:

"The attached texts do not obligate France to any armed co-operation. They do not imply any alliance nor any obligation to participate in defensive action."

The report in presenting this reservation, and referring to the American Senate's action, says:

"The French Government in its turn accepts the view that, in case of difficulties, the treaty contemplates only friendly conversation, and does not imply obligation to intervene by arms in case of conflict."

The report reviews the history of the Washington accord, sets forth its objects and the reasons for its existence, and comments that the tripartite accord was enlarged to include four signatories only after France had presented arguments to show that she was a great Pacific Power and entitled to participate.

The accord applies only to the islands in the Pacific, the report remarks, "and if France were attacked in her continental possessions she would not even have resort to the conversations that ought to precede, and possibly avoid, a rupture."

"France, in such an instance," it continues, "would be aided in her relations with Japan by the treaty concluded with that Power on June 10, 1907, which constitutes a guaranty whose value cannot be disputed."

The advantages of the Pacific accord, the report says, are "all purely moral for all the interested Powers."—*Boston Evening Transcript*, 8 February, 1923.

FRANCO-ITALO ALLIANCE?—Paris, February 14—France is making a military and naval alliance with Italy. This fact was disclosed to me by Pierre Depuy, president of the marine commission of the Chamber of Deputies. He also stated that the attitude of the Italian Chamber might now be exerted favorably upon the French Parliament for the acceptance of the Washington naval agreements, but not without reservations.

"The military and naval alliance now under discussion between France and Italy removes some of the technical difficulties which prevented heretofore the ratifying of the Washington conventions," he said. "From now on the navies of France and Italy will co-operate in the Mediterranean."

"The Washington agreement is not to be settled immediately. There must be considerable parliamentary routine before a vote will be possible. Three or four months must elapse. Also France still is willing to let matters drag a while owing to the confused European political situation. The world's future still is in the melting pot."

"The policy of our Italian alliance will be one of the determining factors of our final acceptance, even though such an alliance does not mean we bind our fate to that of any country or group of Powers."

"The Washington agreement does not appear urgent to the French people. The Ruhr problem and the Near East are taking our entire attention. Thus we may yet have still another opinion of the Washington treaty and the Root reservations."

"We certainly will ratify without discussion the clauses obliging submarines not to attack merchantmen, even though we consider this paragraph of little practical value. In the next war our traders will be armed before leaving port, and, therefore, submarines need not consider them unarmed ships. The Root reservations limiting the building of submarines we do not accept because we consider the submarine our best defense and the only means of keeping in touch with our colonial empire in Africa. The decrease in the birth rate of France forces us to rely on colored recruits, therefore we need submarines to escort troops and transports."

"Regarding the treaty itself, we acknowledge that France has not enough money to build more ships than she was allotted at Washington. We have no aggressive aims, but if we enter such an alliance with the United States and Great Britain they must consider us a partner having equal benefits and responsibilities."—Wyeth Williams in *Boston Evening Transcript*, 14 February, 1923.

NEW CODES FOR WAR USE OF RADIO AND AIRCRAFT.—The Hague, February 20—The conference of jurists appointed under the resolutions of the Washington armament conference to study the laws of war, ended its sessions yesterday. Their report contains two proposals regarding wireless telegraphy and the use of aircraft in time of war. The report will be presented to the governments concerned and they will decide whether it shall eventually be published.

This conference was held under a resolution adopted by the Washington Conference which provided that the first step toward revision of warfare regulations should be taken up by a "commission," presumably composed of international law experts, without plenipotentiary powers, but the resolution provides that after they have agreed the five Governments shall "confer as to the acceptance of the report and the course to be followed to secure the consideration of its recommendations by civilized Powers."

It was taken for granted at Washington that questions of national policy as well as legal considerations would enter into the final decisions reached and that the whole problem of the submarine, one of the storm centers of the Washington Conference, would be reopened.

In leaving determination of new rules of warfare to a later conference, the Washington Conference carried out the recommendations of a subcommittee of experts who spent several weeks considering the subject.

The resolution of the conference providing for this conference said:

The United States of America, the British Empire, France, Italy and Japan have agreed:

1.—That a commission composed of not more than two members representing each of the above-mentioned Powers shall be constituted to consider the following questions:

(a) Do existing rules of international law adequately cover new methods of attack or defense resulting from the introduction or development, since The Hague Conference in 1907, of new agencies of warfare?

(b) If not, what changes in the existing rules ought to be adopted in consequence thereof as a part of the law of nations?

2.—That notices of the appointment of the members of the commission shall be transmitted to the Government of the United States of America within three months after the adjournment of the present conference, which after consultation with the Powers concerned will fix the day and place for the meeting of the commission.

3.—That the commission shall be at liberty to request assistance and advice from experts in international law and in land, naval and aerial warfare.

4.—That the commission shall report its conclusions to each of the Powers represented in its membership.

Those Powers shall thereupon confer as to the acceptance of the report and the course to be followed to secure the consideration of its recommendations by the other civilized Powers.

The committee also adopted a resolution which is in effect a part of the resolution.

Resolved, That it is not the intention of the Powers, agreeing to the appointment of a commission to consider and report upon the rules of international law respecting new agencies of warfare, that the commission shall review or report upon the rule or declarations relating to submarines or the use of noxious gases and chemicals already adopted by the Powers in this conference.

It will be noted that this resolution did not itself mention poison gas, submarines, aircraft or wireless, but discussion, other resolutions and negotiations at Washington did. The Committee on Limitation of Armament voted unanimously that:

The committee is of the opinion that it is not at present practicable to impose any effective limitations upon the numbers or characteristics of aircraft, either commercial or military.

The committee is of the opinion that the use of aircraft in war should be covered by the rules of warfare as adopted to aircraft by a further conference which should be held at a later date.—*Boston Evening Transcript*, 20 February, 1923.

BRASSEY'S NAVAL AND SHIPPING ANNUAL.—From year to year *Brassey's Naval and Shipping Annual* appears to increase in bulk and value. It has now reached its thirty-fourth year of publication, and the volume just published is the third in its improved and enlarged form. In every respect it reflects the highest credit upon the joint editors (Sir Alexander Richardson, M.P., and Mr. Archibald Hurd), upon the art editor (Mr. A. J. W. Burgess), and the publishers (William Clowes and Sons, Limited).

In addition to silhouettes, there are numerous illustrations and plans of British and foreign warships, the illustrations including designs for "Washington Conference" capital ships and light cruisers, and also a design for an experimental battleship. The chapter devoted to comparative naval strengths, with tables of battleships, battlecruisers, and light cruisers of the five great naval Powers, is also a feature which will be much appreciated.

Commander C. N. Robinson again deals with the progress of the British Navy, and Mr. John Leyland with that of foreign navies, and both articles are so full of useful facts that they should be studied by all who are desirous of taking an intelligent interest in the changes in and developments of the navies of the Great Powers.

Washington and After

Of the general articles, one of the most important is that by Admiral of the Fleet Sir Doveton Sturdee on "Naval Aspects of the Washington Conference." Admiral Sturdee has written a comprehensive and discriminating review of the situation of 1921 and at the present time; and he leaves no doubt that the recent decision of the Government "to construct under the terms of the treaty two capital ships of 35,000 tons to carry guns of not greater caliber than 16-in." has his unqualified support.

"In order to maintain a 'one-Power standard' in capital ships," Admiral Sturdee declares, "their construction is essential. At the present moment the United States possesses three post-Jutland capital ships carrying 16-in. guns, and Japan two, while Great Britain has only the *Hood*, a ship commenced before the battle of Jutland, which only carries guns of 15-in. caliber, besides not embodying the valuable experience obtained on that occasion. Thus Great Britain has no capital ship carrying 16-in. guns, and has only one recent ship to take her place in the line of battle to three possessed by the United States and two by Japan.

"One of the most important revelations during the war was the great superiority of a ship with large caliber guns over a ship with guns of less caliber. This, with the increasing range at which future naval actions will commence, renders it all the more desirable that these two new ships should be constructed. It is most noteworthy that in the opinion of the senior officers of the maritime nations in command of fleets in the recent war, the capital ship still remains the bed rock on which all naval strength must be based. As the Grand Fleet controlled the movement of the High Sea Fleet in the recent war, so the battle fleet in the near future will render subsidiary movements either possible or impossible."

Experimental Battleships

It is appropriate that the subject of the next article in the volume should be "The Influence of the Washington Conference on Naval Design." This is contributed by Sir George Thurston, and three of the drawings mentioned above illustrate portions of the text.

"It may be of interest," the writer remarks, "to consider a special type of battleship designed as an experiment to comply with the conditions laid down at the Washington Conference, seeing that the exceedingly small number of capital ships to be constructed during the next ten years cannot appreciably affect the relative positions of the contracting Powers.

"The type in question with a speed exceeding 30 knots would be provided with a maximum of vertical and horizontal armored protection, including the fullest underwater protection. The main armament would consist of three 16-in. guns triple-mounted in a barbette forward. The auxiliary armament would consist of, say, 6 twin-mounted 7½ in. or 8-in. guns, together with a certain number of 4.7-in., or 6-in. anti-aircraft guns on disappearing mounts.

"The vessel would, so far as the arrangement of armament allowed, be fitted as a carrier for aircraft, such craft being purely for the purpose of her own defense and action. This solitary and powerful unit could, if required, take her place in the fighting line as part of a battle fleet, or, in emergency, be dispatched for foreign stations, possessing high speed and fully equipped as regards armament and protection. Dispensing with the usual protection afforded by accompanying craft and aeroplanes, she would carry within her the planes necessary for scouting, or torpedo and bomb dropping, and her upper or super-structure deck would be constructed without obstacles for the launching and return of her aircraft. To effect this her general appearance and arrangement as a capital ship would be materially altered, the funnels and deck casings would entirely disappear, and the smoke and other products of combustion be conducted overboard through ducts swept by the water from the circulating pumps and other sources."

A varied and most interesting series of articles follow, the list of contributors including Capitaine A. Delpierre, late of the French Navy; Rear Admiral W. H. D'Oyley, Commander C. Dennis Burney, R. N. M. P.; Mr. Archibald Colbeck, Commander H. Rundie, R. N.; and Commander C. N. Robinson. An article by Sir. Eustace H. T. d'Eyncourt on "The Royal Corps of Naval Constructors" has been dealt with in a previous issue of *The Naval and Military Record*.

Mercantile Marine

Among the contributors to the merchant shipping section of *The Annual* are Sir Westcott Abell (chief ship surveyor, Lloyd's Registry of Shipping), Mr. R. W. Richardson, Sir Lord Inchcape, Mr. James Richardson, Sir Frederick Lewis, Sir A. G. Anderson, M. J. Anderson, Mr. F. A. Hook, Capt. Harry Davis, Mr. Sanford D. Cole, and Mr. G. A. Vallance. These writers are all experts in the subjects which they have chosen to discuss, and their views may be read with interest and profit by all connected with the mercantile marine.—*Naval and Military Record*, 24 January, 1923.

THE NICARAGUA CANAL.—Estimates by army engineers that the cost of constructing a new isthmian canal through Nicaragua would be nearly \$1,000,000,000, led to an announcement by President Harding today that the project had been abandoned for the present.

The President had hoped, it was said, that it might be possible to build a Nicaraguan canal out of the earnings of the Panama Canal,

which has been doing an unprecedented business for six months. The pre-war price of building the Nicaraguan canal, with dimensions similar to those of the waterway at Panama, would have been \$494,000,000, according to an estimate given to Secretary Weeks by Major General Lansing H. Beach, Chief of Engineers of the Army. Present-day costs, however, would more than double this figure.

A statement issued by Secretary Weeks today, including the report of the army engineers, said the commission named by Roosevelt in 1901 estimated the cost of a canal via the Nicaragua route, thirty-five feet deep with 450 feet minimum bottom width and eight locks, four on each side of the Nicaragua lake, each with two chambers eighty-four feet by 740 feet clear dimensions, at \$189,864,062.

The protocol just signed with Costa Rica by the United States Government, it was explained today by a high Administration official, does not mean that any rights have been conceded to that country which have not been recognized by this Government right along. The protocol, it was stated, consists principally of an engagement to negotiate with Costa Rica to take care of any Costa Rican rights that might be involved in the construction of a Nicaraguan canal by the United States, so that there will be no violation of Costa Rican sovereignty. The agreement is in no sense a treaty, it was explained, but merely an engagement to discuss the subject under consideration and does not in itself constitute a full agreement upon that subject.—*New York Times*, 10 February, 1923.

PANAMA CANAL TOLLS.—A cablegram has been received from Colonel Morrow, Governor of the Panama Canal, that the receipts for tolls for commercial vessels transiting the Canal during January, as well as the number of vessels, breaks all previous records, the total number of commercial ships being 352 and the receipts from tolls \$1,505,285.55, as compared with the monthly average for the previous six months ending December 31, 1922, of 273 ships and \$1,167,007.23 for tolls.

The following statement shows receipts from tolls on commercial vessels transiting the Panama Canal during the past seven months in comparison with receipts for the same seven months of the fiscal year 1922; also monthly averages for fiscal years 1919-22, inclusive:

Month	Number of Commercial Vessels		Tolls Collected	
	1922-3	1921-2	1922-3	1921-2
July.....	251	206	\$1,094,127.42	\$ 804,503.11
August.....	257	236	1,055,336.75	955,380.78
September.....	240	221	1,020,064.55	892,001.54
October.....	294	255	1,255,508.00	1,047,935.62
November.....	294	222	1,264,436.54	923,048.70
December.....	304	239	1,312,570.12	1,003,598.27
January.....	362	210	1,505,285.55	847,767.55
TOTAL 7 mos...	1,992	1,589	\$8,507,328.93	\$6,474,235.57
Average, 7 mos.....	284	227	\$1,215,332.70	924,890.80

FEDERAL REORGANIZATION PLAN TO AWAIT STUDY.—Proposals for the sweeping reorganization of the Federal Government, in accord with the Administration plan just submitted to the joint Congressional Committee, will require exhaustive study before there will be any consideration of action by Congress.

The joint Committee engaged in preliminary discussion today with the chairman, Walter F. Brown, and adjourned to meet next week, when the

question of hearings will be decided and the procedure of the committee determined.

No Action This Session

There is no thought of action in this session of Congress. Whether the joint committee will work through the Congressional vacation period and hold hearings in that time is to be settled.

The first desire of the Administration is to arrange suitable publicity to bring favorably before the country the program involving so extensive a modification of the executive departments, including the consolidation of the War and Navy Departments into one department of defense, creation of a new Department of Education and Welfare and change of the name of the Postoffice Department to Department of Communications.

Program in Detail.

In the meantime here is a picture of the executive branch of the Government as it would be under the Administration's program:

The President, secretary and staff.

1. Department of State

Secretary of State, diplomatic service, consular service, United States sections international commissions.

(a) Under Secretary of State, office of economic adviser, divisions of Latin-American affairs, Mexican affairs, current information, publications and office of special agent.

(b) Assistant Secretary, divisions of Western European affairs, Near Eastern affairs, Eastern European affairs and bureau of appointments.

(c) Assistant Secretary, division of passport control, visa office, diplomatic bureau and bureau of indexes and archives.

(d) Assistant Secretary, office of ceremonials, division of Far Eastern affairs, bureau of accounts and war trade board section.

(e) Assistant Secretary, bureau of insular affairs, consular bureau, office of consular personnel, commercial office, division of political and economic information and office of chief clerk.

(f) Solicitor.

2. Department of the Treasury

Secretary of the Treasury.

(a) Under-Secretary, in charge of fiscal bureaus: Commissioner of the Public Debt, division of loans and currency; Register of the Treasury, division of public debt accounts and audit, savings division; Commissioner of Accounts and Deposits, divisions of bookkeeping and warrants and deposits; Treasurer of the United States, Comptroller of the Currency, bureau of mint, Federal farm loan bureau, secret service division.

(b) Assistant Secretary, in charge of foreign loans and miscellaneous: Bureau of engraving and printing, general accounting office, departmental executive offices, Solicitor of the Treasury.

(c) Assistant Secretary, in charge of collection of revenues: Bureau of internal revenue, solicitor of internal revenue, prohibition commissioner; division of customs, customs service.

3. Department of Defense

Secretary for Defense:

(a) Under-Secretary for the army, assistant secretary; executive offices: General staff, war boards and commissions, offices of adjutant-general, inspector-general, judge-advocate-general, quartermaster-general, chief of finance, surgeon-general, chief of ordnance, chief of chemical warfare service; militia bureau, chief of chaplains, chief signal officer, chief of

air service, chief of infantry, chief of cavalry, chief of field artillery, chief of coast artillery, chief of engineers, Military Academy, Panama Canal.

(b) Under-Secretary for the navy, assistant secretary; executive offices: Office of naval operations, navy boards, bureau of navigation, Naval Academy, bureaus of yards and docks, ordnance, construction and repair, engineering, aeronautics, supplies and accounts, medicine and surgery, revenue cutter service, headquarters Marine Corps, judge-advocate-general, solicitor.

(c) Under-Secretary for national resources, assistant secretary; executive offices: For men, munitions, food and clothing, transportation, communications, fuel, miscellaneous.

(d) Joint board.

(e) National advisory committee for aeronautics.

4. Department of the Interior

Secretary of the Interior, Executive offices:

(a) Assistant Secretary for public domain, Alaska and Hawaii, Indian lands and reservations, general land office, geological survey, war minerals relief commission, national park service, national military park commissions, Federal power section.

(b) Assistant Secretary for public works, bureau of public roads, supervising architect's office, Alaskan engineering commission, reclamation service, board of engineers for rivers and harbors, including board of engineers for New York city, United States Engineer offices, Mississippi river commission and California debris commission; board of road commissioners for Alaska, bureau of District of Columbia buildings and grounds.

(c) Solicitor.

5. Department of Justice

Attorney-General; Solicitor-General.

(a) War contracts section.

(b) Bureau of Investigation.

(c) Office of Pardons.

(d) Assistant to the Attorney-General over anti-trust division.

(e) Assistant Attorney-General over division for defense of suits.

(f) Assistant Attorney-General over public lands division, including office of titles and office of land litigation in District of Columbia.

(g) Assistant Attorney-General over criminal division.

(h) Assistant Attorney-General over division of admiralty, finance, foreign relations, territorial and insular affairs, and over alien property custodian.

(i) Assistant Attorney-General over division of taxation, insurance, prohibition and minor regulations of commerce.

(j) Assistant Attorney-General over customs division.

(k) Assistant Attorney-General over executive offices.

6. Department of Communications (Postoffice)

Secretary of Communications, under-secretary of communications, executive offices.

(a) Assistant Secretary for postal service, postmasters' appointments division, postoffice service division, dead letter division.

(b) Assistant Secretary for postal transportation, railway mail service, railway adjustments, foreign mails, air mail service.

(c) Assistant Secretary for postal finance, office of comptroller, money orders, postal savings, registered mails, stamp division, finance division, classification division.

(d) Assistant Secretary for postal purchases and supplies, rural mails, motor vehicle service, equipment and supplies.

(e) Assistant Secretary for telephone and telegraph (including radio), with separate telephone and telegraph divisions.

(f) Chief Inspector.

(g) Solicitor.

7. Department of Agriculture

Secretary of Agriculture, Assistant Secretary, executive offices and following subdivisions: Administration of packers and stockyards and trading in grain futures, weather bureau, bureau of animal industry, bureau of plant industry, botanic garden, forest service, bureau of chemistry, bureau of soils, bureau of entomology, bureau of biological survey, division of publications, States' relations service, bureau of agricultural economies, insecticide and fungicide board, Federal horticultural board, solicitor.

8. Department of Commerce

Secretary of Commerce, executive offices:

(a) Assistant Secretary for Industry, bureaus of standards, mines, fisheries and Federal statistics, including census, customs statistics, mineral production statistics and internal commerce statistics; bureau of patents.

(b) Assistant Secretary for Trade, bureau of foreign and domestic commerce, United States section inter-American high commission, bureau of transportation, including airways, waterways (all Federal canals except Panama) and highways.

(c) Assistant Secretary for Merchant Marine, coast and geodetic survey, including lake survey and hydrographic office; national observatory, bureau of lighthouses, life-saving service, bureau of navigation, steamboat inspection, inland and coastwise waterways service, supervisor of New York harbor.

(d) Solicitor.

9. Department of Labor

Secretary of Labor, assistant secretary, second assistant secretary, executive offices; bureaus of immigration, naturalization, labor statistics, women's bureau, children's bureau, division of conciliation, employment service, housing corporation, solicitor.

10. Department of Education and Welfare

Secretary of Education and Welfare, executive offices.

(a) Assistant secretary for education, general education, including bureau of education, Indian schools, Howard University, Columbia Institution for the Deaf, Smithsonian Institution; physical education, vocational education and section for vocational rehabilitation.

(b) Assistant secretary for public health service, quarantine and sanitation, hospitalization, national home for disabled volunteer soldiers, soldiers' home, St. Elizabeth's Hospital, Freedmen's Hospital, research.

(c) Assistant secretary for social service, women's bureau, children's bureau, superintendent of prisons.

(d) Assistant secretary for veteran relief, veterans' bureau, bureau of pensions.

(e) Solicitor.—*Baltimore Sun*, 17 February, 1923.

CURRENT NOTES AND PROFESSIONAL PAPERS

"A Review of Different Types of Marine Internal-combustion Engines—Part I."—(A collection of papers read in Newcastle before the North-East Coast Institution of Engineers and Shipbuilders, on 12 January, 1923).—*The Marine Engineer and Naval Architect*, February, 1923.

"Twenty Years of Diesel Engine Building."—(A review of progress made up to and including a proposed 40,000-B. H. P. Naval Vessel.)—By Engineer Lieutenant Commander L. J. Mesurier in *The Engineer*, 26 January, 1923.

"The Muscle Shoals Nitrate Plant."—(Showing relation of this plant to the Nitrogen supply, and discussion of the three processes for the fixation of Nitrogen.)—By John K. Clement in *Army Ordnance* for February, 1923.

"The World Race for Oil."—(Extracts from local and foreign press articles on the control of the oil supply of the world.)—*The Literary Digest*, 20 January, 1923.

"Japan: A Sequel to the Washington Conference."—(To be published in full in May issue of the NAVAL INSTITUTE PROCEEDINGS.)—By Hector C. Bywater in the *Atlantic Monthly*, February, 1923.

"The Relation of Politics to War."—(A discussion of the Eastern Question from the point of view of the relation of policy and strategy and comparing England's lack of doctrine with regard to the Eastern Question as compared to their excellent doctrine from the very start of the World War.)—By Sir Edward M. Grigg in *The Journal of the Royal Artillery*, January, 1923.

Pertinent articles in:

Current History for February, 1923:

1. "Europe's Tangled Problems," by Irving Fisher.
2. "Foreign Policy of the New Turkey," by Clair Price.
3. "Aviation Progress in America," by Rear Admiral W. A. Moffett, U. S. Navy.
4. "Cost of our Wartime Aircraft," by Major General Patrick, U. S. Army.
5. "Militarism in Central America," by Thomas R. Dawley.

The Fortnightly Review for January, 1923:

1. "Is the Washington Naval Treaty Doomed?" by Archibald Hurd.
2. "The Problem of Oil Supplies," by Sidney H. North.

Journal of the Royal United Service Institution for February, 1923.

1. "Jutland and the Principles of War," Translation of an article by Capitaine de Corvette Richard.

2. "The Cruise of the *Wolf*," translated from the *Revista Marittima*.

Edinburgh Review for January, 1923:

"The High Command in 1914."

The Atlantic Monthly for February, 1923:

1. "Putting the Navy to the Test," by L. S. Mayo.
2. "A League of Nations or a League of Governments?" by L. P. Jacks.

Review of Reviews for January, 1923:

"Why We must Maintain the Navy," by W. H. Gardiner.

The World's Work for February, 1923:

"America's duty in the Near East," by Charles W. Eliot.

The American Review of Reviews for February, 1923:

"Talking over Pacific Problems," by Riley H. Allen.

NOTES ON INTERNATIONAL AFFAIRS

FROM JANUARY 23 TO FEBRUARY 23

PREPARED BY

ALLAN WESTCOTT, Professor, U. S. Naval Academy

FRENCH OCCUPATION OF THE RUHR

EXTENSION OF ALLIED CONTROL.—The February record of developments in the occupation of the Ruhr region by France and Belgium consisted of a series of riots, strikes, conflicts between French and German authorities, and extension of French control for punitive or other purposes. The more noteworthy events were as follows:

(1) The Reparation Commission on January 26 declared Germany in general and complete default, thus affording France and Belgium freedom to employ all measures and penalties prescribed by the Versailles treaty.

(2) The Occupation forces on January 27 established a customs barrier along the frontier between the Ruhr and the rest of Germany, with the object of regulating and collecting taxes on all exports. This was followed on January 31 by an embargo on all coal shipments into Germany.

(3) On February 4 the occupied region was extended by the seizure of the railway junctions of Oppenburg and Appenweier beyond the Strassburg bridgehead, thus giving control of the direct rail route from Frankfort to Switzerland. This measure was taken in retaliation for the stoppage of the Paris-Prague and Paris-Bucharest expresses.

(4) Following the visit of Premier Cuno to Essen, all members of the German state or federal governments were prohibited on February 10 from entering the occupied region.

(5) On February 13 at the opening of the British Parliament, Premier Bonar Law declared that France in entering the Ruhr was following a policy "disastrous not only to England but to herself and even to the economic life of Europe." The debate in Parliament indicated that all parties supported the government in its policy regarding the Ruhr occupation.

BRITISH POLICY.—At the opening of the British Parliament on February 13, Premier Bonar Law concluded his speech as follows:

"The French may occupy the left bank of the Rhine or the Ruhr for ten years, but if the net result is to intensify the feeling of German

nationality the danger will come later, and I do not think it is any advantage to France.

"We still have our troops on the Rhine. I do not know whether it would be possible for them to remain there long. Up till now it has not become acute, but it may. It is perfectly true that either the German or French Government could easily make it impossible for our forces to remain, but I think it would be a misfortune. While we are there we are at least in touch with the situation and have a chance of having a say in it. I think it would be a pity to bring an end to the Entente. It is no good appealing to the League of Nations if you are certain that France will have nothing to do with it. I am certain that that would be her attitude. It may be that in a few months' time they might look upon that as possible. If so, then, in my view, it would be time to make the attempt."

WHY FRANCE IS IN THE RUHR.—There is a party in France which is playing for the hegemony of Europe and much besides. Its ideals are pretty much what the ideals of Germany were before the war. Instead of the Bagdad Railway, there is the North African empire, with its reservoirs of fighting men to take the place of those. Germany, in her wild chauvinistic moods, dreamed of training further south. The difference is that the "copper" army of France is already a partially accomplished fact. But while France in North Africa grows, silently but steadily, there is Germany's economic example in her western coal and iron fields to be copied immediately, and bettered in the copying. That is one of the things which do not appear on the surface, for which France is in the Ruhr. Reparations? It would be a disappointment if these were forthcoming. But the indefinite exploitation of the Ruhr coal and iron fields in conjunction with the iron of Lorraine and the coal of the Sarre, of Briey, and of Longwy, this would make France the dominating industrial force in Europe, and reduce Germany to impotency. There you have one of the true reasons for the presence of General Degoutte's men in the Ruhr, for segregation of the Ruhr, and for certain other things, none of which are less actual because they do not appear in dispatches dated from the Quai d'Orsay. It was the Westphalian coal magnates, unable to get full value from their coke ovens, who combined with the general staff in demanding Lorraine, in 1871. The one wanted iron, the other a strategic frontier. Now, under the cloak of reparations, the directors of French industrialism reverse the process. Decidedly Paris has bettered the instruction of Berlin.—*International Interpreter*, February 3.

TURKEY AND NEAR EAST

TREATY TERMS SUBMITTED.—On February 1 the Allied draft treaty was presented to the Turkish delegates at Lausanne with the understanding that Lord Curzon would remain until February 4 to await Turkish acceptance. As finally presented the treaty modified the capitulation terms regarding foreigners in Turkish courts as follows:

Turkey engages to employ legal counsellors chosen from a list drawn by the Permanent Court of International Justice. These counsellors will participate in the preparation of legislative reforms and will be assigned to judicial districts of the courts of appeal at Constantinople and Smyrna and the ordinary courts of Samsun and Adana. They will not sit as judges, but will have the right to receive complaints from foreigners respecting the administration of the law and submit these complaints to competent Turkish authorities in order to insure strict observance of the Turkish code.

Arrests of foreigners must be executed in accordance with the views of the counsellors, while Turkey recognizes the legality of decisions in civil and commercial cases reached by outside arbitration.

Other concessions it is understood the Allies offered include:

1. Acceptance of the non-limitation of the the number of Turkish troops in Eastern Thrace, previously set at 20,000.

2. Reduction of the reparations of the Allies from 15,000,000 to 12,000,000 Turkish gold pounds.

3. Acceptance of the distribution of the principal of the Ottoman debt among Turkey and the so-called succession states, formed from the old Turkish Empire, without awaiting the consent of the bondholders.

4. Elimination of the clause in the Allied draft treaty whereby the Turkish Government would be required to ask the advice of the Council of the Ottoman debt in all concessions to Turkey or foreigners.

NO AGREEMENT REACHED.—Urgent appeals were made to the Turkish delegates to accept the terms as laid down. The French government, however, made it clear that France did not regard the treaty as an ultimatum, and that even if it were not accepted, negotiations might be resumed later on. In a note on February 4 the Turkish delegates offered to accept eighty per cent of the treaty and leave for further discussion the matters still in dispute, relating especially to capitulations, control of concessions, and distribution of the Ottoman debt. Hoping by what Lord Curzon described as "bazaar methods of bargaining" to secure further concessions, they refused to accept the treaty in its entirety.

After the break up of the conference, Ismet Pasha returned to Angora on February 20. It was expected that the Turkish government would make a detailed reply to the Allied terms, with the possibility of a settlement still in view.

SMYRNA CLOSED TO NAVAL VESSELS.—At the break-up of the Lausanne Conference the Angora government issued a notice demanding that by February 7 all foreign warships over 1,000 tons should leave the harbor of Smyrna. The Allied powers rejected this demand and sent naval vessels to reinforce those already in the port. The only American vessel in Smyrna at the time was the destroyer *Edsall*. After further protests and delays, the notice was finally withdrawn and the matter left for diplomatic settlement.

GREAT BRITAIN AND IRELAND

BRITISH DEBT SETTLEMENT.—On January 31 it was announced that the British Cabinet had accepted the American terms for the settlement of the British debt to the United States. In brief, these terms provided for the payment of three per cent interest and one-half per cent amortization fund for ten years, and three and one-half interest until final payment fifty-two years thereafter. The U. S. Senate on February 16 passed the British Debt Refunding Bill by a vote of 70 to 13. The

official summary of the provisions for settlement was given out as follows:

Principal of notes to be refunded.....	\$4,074,818,358.44
Interest accrued and unpaid up to December 15, 1922, at the rate of $4\frac{1}{4}$ per cent.....	629,836,106.99
Total	\$4,704,654,465.43
Deduct payments made October 16, 1922, and November 15, 1922, with interest at $4\frac{1}{4}$ per cent thereon Decem- ber 15, 1922	100,526,379.69
Total	\$4,604,128,085.74
To be paid in cash.....	4,128,085.74

Total principal of indebtedness as of December 15, 1922,
for which British Government bonds are to be issued
to the United States Government at par\$4,600,000,000.00

The principal of the bonds shall be paid in annual installments on a fixed schedule, subject to the right of the British Government to make these payments in three-year periods. The amount of the first year's installment will be \$23,000,000 and these annual installments will increase with due regularity during the life of the bonds until, in the sixty-second year, the amount of the installment will be \$175,000,000, the aggregate installments being equal to the total principal of the debt.

The British will have the right to pay off additional amounts of the principal of the bonds on any interest date upon ninety days' previous notice.

Interest is to be payable upon the unpaid balances at the following rates, on December 15 and June 15, of each year.

Three per cent semi-annually, June 15, 1923, to December 15, 1932, inclusive.

Three and one-half per cent semi-annually, June 15, 1933, until final payment.

For the first five years one-half the interest may be deferred and added to the principal, bonds to be issued therefore similar to those of the original issue.

Any payments of interest and of principal may be made in any United States Government bonds issued since April 6, 1917, such bonds to be taken at par and accrued interest.

IRISH AMNESTY ENDED.—The latest ten-day amnesty extended by the Irish Free State Government for the surrender of Irish rebels ended on February 17. President Cosgrove issued a warning of the government's determination thereafter to put down all revolt regardless of cost.

BRITISH CONTROL OF COTTON MANUFACTURE.—There is good authority for stating that during the last half century the world's demand for cotton goods has trebled. Naturally enough, many countries, including the United States, have entered upon cotton manufacturing for themselves. This development has not cut off British trade, but has merely produced greater variety and excellence in her fabrics. Today England owns, according to the estimate of Sir Charles Macara, nearly half the world's spindles, and exports about seventy-five per cent of the products of these spindles, as well as the dependent machinery, to all parts of the

world. These exports represent about a third of the total exports of the United Kingdom. On the other hand, America, possessing much British machinery and the pick of British technical advisers, and producing five eighths of the world's raw cotton, has not much more than half Britain's spindles, and an exportable surplus of goods of only about five per cent. The value of Great Britain's exports in 1920 was over £400,000,000. In the ten years preceding the war, Great Britain added 12,000,000 spindles to her total, considerably more than some countries have got together in the course of one hundred years; and in the decade preceding 1914, as many spindles were added to British resources as India, China, and Japan have got together in seventy-five years.

Sir Charles Macara points out that there are still in the world a great multitude of people only partially clothed so that there will be enough trade for all, the United States included, without the erection of tariff walls, and the facts enumerated above justify, in his opinion, the confidence of Lancashire in the future.—*International Interpreter*, February, 10.

RUSSIA AND NORTH EUROPE

MEMEL GIVEN TO LITHUANIA.—On January 31 the Allied Governments called upon Lithuania to bring about the withdrawal of irregular forces from the Memel region and the dissolution of the insurgent government which had been set up in the city. Subsequently, by a decision of the Council of Ambassadors on February 16, the district was awarded to Lithuania.

The Ambassador's statement says:

"The conditions laid down by the Allied Governments having been fulfilled, the Council of Ambassadors this morning reached a decision concerning Memel in accordance with the mandate of the Allied Governments. This decision awards sovereignty over Memel to Lithuania which certain conditions relative to the establishment of autonomy and the organization of sea and river traffic and the régime of the port in order to take account of the needs of the Lithuanian and Polish regions, of which Memel is the natural outlet."

POLES AND LITHUANIANS IN CONFLICT.—The Council of the League of Nations in session at Paris handed down at the beginning of February a decision providing for control and administration of the neutral zone between Poland and Lithuania. The decision called for the disarming of irregular bands in the district and division of administration between the two states. At the time of the decision, the Lithuanian delegate declared that Lithuania would use force to resist its execution, which led President Viviani to threaten the penalties of blockade prescribed in Art. XVI of the League Covenant.

Poland subsequently occupied the zone allotted to her, and on February 18 there were reports of serious hostilities between forces of the two nations.

INTERNATIONAL AGREEMENTS

NAVAL TREATIES RATIFIED.—The Italian Chamber of Deputies on February 7 and the Italian Senate ten days later ratified the Washington

Naval Treaties. It was expected that France would shortly follow the example of Italy. Extracts from the report of the French parliamentary commission assigned to study the treaty are given as follows:

The report, which was drafted after thorough discussion in the commission, is believed to represent the sentiments not only of the commission but of the Government. It includes a reservation similar to that adopted by the American Senate, designed to leave France free from obligations of any armed co-operations. The reservation reads:

"The attached texts do not obligate France to any armed co-operation. They do not imply any alliance for any obligation to participate in defensive action."

The report, in presenting this reservation and referring to the American Senate's action, says:

"The French Government in its turn accepts the view that in case of difficulties the treaty contemplates only friendly conversation, and does not imply obligation to intervene by arms in case of conflict."

The report reviews the history of the Washington accord, sets forth its objects and the reasons for its existence, and comments that the tripartite accord was enlarged to include four signatories only after France had presented arguments to show that she was a great Pacific power and entitled to participate.

The accord applies only to the islands in the Pacific, the report remarks, "and if France were attacked in her continental possessions she would not even have resort to the conversations that ought to precede, and possibly avoid, a rupture."

"France, in such an instance," it continues, "would be aided in her relations with Japan by the treaty concluded with that power on June 10, 1907, which constitutes a guarantee whose value cannot be disputed."

ITALY IN THE ADRIATIC.—On February 16 the Italian Parliament completed ratification of the Agreement of Santa Margherita with Jugoslavia, which practically confirms the *status quo* in the Adriatic region. Italy evacuates Sussak but retains the Delta Porto Barros so long as Fiume insists on being internationally recognized as an independent state. Mussolini spoke of the treaty in the Senate as follows:

Turning his attention to the situation in the Adriatic, Mussolini said that foreign policy must not be swayed by sentiment.

"We must have the courage to recognize that Italy cannot remain in the Adriatic," he said, "There are other seas."

"The agreement of Santa Margherita at least protects the Italian language in Dalmatia, and, as our eminent statesman and author, Signor Gioberti, has said, where language is there is the nation. We will apply the agreements loyally and scrupulously, but we expect equal loyalty and scrupulousness from Jugoslavia."

The Premier reverted to his favorite theme when talking of the treaty with Jugoslavia, namely, that all treaties can be revised.

"Treaties are compromises," he said. "No treaty is perfect, just as no treaty is eternal. Even events which are happening in Europe today teach us this lesson."

"I must say that since the advent of the Fascista Government to power Jugoslavia has showed herself less intransigent. My Government does not avoid difficulties; it faces them."

"We must never believe that anything is irreparable. Ancient Rome did not believe that the defeat at Cannae was irreparable. Rome fell,

but she rose again. So must Italy prepare her spirit and her strength to dominate her future destiny."

WORK OF LEAGUE COUNCIL.—The League of Nations Council opened its twenty-third session in Paris on January 29 and closed on February 3. Among matters decided or discussed may be noted:

(1) *Amendment of Article X.* It was decided that member nations be requested to submit observations in order that a report might be submitted at the fourth plenary session of the Assembly.

(2) *Naval Conference.* It was decided to call a conference of naval powers not signatories of the Washington Treaties, the date to be set after the Pan-American Conference at Santiago.

(3) *Hungarian frontier.* Hungary and Czecho-Slovakia accepted the procedure proposed by the Council for settlement of their boundary dispute by a special commission.

(4) *Armament Expenditures.* Member nations were invited to limit armament expenditures so as not to exceed the amounts appropriated in 1913.

(5) *Settlement of Polish-Lithuanian Frontier.* See treatment elsewhere in *International Notes*.

(6) *Rehabilitation of Austria.* A report was submitted showing stabilization of Austrian currency, reduction in cost of living, and increase of savings. Austria was authorized to borrow from international bankers £3,500,000 on security of customs and railroad receipts and underwritten by Britain, France, Italy, Czechoslovakia, Spain, Belgium, and Switzerland. This is the first of a series of similar loans to total about \$150,000,000.

UNITED STATES AND LATIN AMERICA

NEGOTIATIONS FOR NICARAGUAN CANAL ROUTE.—Washington, Feb. 7—Negotiations with a view to clearing away the complications that had been threatened by the opposition of Costa Rica, Salvador and Honduras to the Bryan-Chamorro Treaty between the United States and Nicaragua for a new interoceanic canal route across Nicaragua have been quietly and successfully conducted by the Harding Administration during the meeting in Washington of the Central American conference.

While no official announcement of the result has been authorized, it is understood that the negotiations have reached a very successful stage. Since the Bryan Shamorro treaty was ratified by the Senate on February 18, 1916, with a reservation to the effect that nothing in the Nicaraguan Canal route treaty was intended to affect any existing right of Costa Rica, Salvador and Honduras, it will be necessary to seek the advice and consent of the Senate to such agreements as flow from the negotiations in which the State Department has been engaged with a view to overcoming the protests which were made by those nations.

The Bryan-Chamorro treaty was negotiated during the first Wilson term by former Secretary Bryan and General Emileano Chamorro, who acted both as President of Nicaragua and special envoy to Washington to negotiate the treaty. It was signed at Washington on August 5, 1914, and granted to the United States in return for a money payment

of \$3,000,000 to Nicaragua the exclusive proprietary rights necessary for the construction, operation and maintenance of an interoceanic canal by a Nicaraguan route, the lease for ninety-nine years of Great and Little Corn Islands in the Carribbean Sea and the right to establish a naval base on the Gulf of Fonseca.—*New York Times*, February 8.

CENTRAL AMERICAN CONFERENCE ENDED.—The conference of Central American states, begun at Washington on December 4, ended on February 7. The results of the conference consisted chiefly in revival or extension of agreements made in the previous conference of 1907, including a general treaty of peace and amity, and an agreement not to recognize governments set up by revolution in defiance of the constitution. A Central-American Court of Justice for international disputes was established, with provision that other international problems be dealt with by a Central American Bureau. It was provided that armies be reduced to 5,200 for Gautemala, 4,200 for Salvador, 2,500 for Honduras, 2,500 for Nicaragua, and 2,000 for Costa Rica.

AMERICAN ISOLATION.—There was something peculiarly forceful about the way in which Mr. Frank O. Lowden, former governor of Illinois, put the much discussed question of "American isolation," in the course of a speech in New York, the other day. "If we are willing to pay the price," declared Mr. Lowden, "maybe we can get back our isolation. But let me tell you the price. It would be the reversion of thirty per cent of our wheat fields and twenty per cent of our corn fields back to the native prairie land. Fifty per cent of the cotton fields of the south would go back to the original forest; we would close up a lot of copper mines; and we would have to revolutionize completely our industry and commerce if we would regain that isolation which we long ago lost. Are we willing to pay the price?" If Mr. Lowden errs at all, it is, surely, on the side of moderation. It is safe to say that the price would never be paid; that, long before any position had been reached such as that outlined by Mr. Lowden, economics would have reasserted their control of politics.—*International Interpreter*, February 10.

FAR EAST

RUSSIAN MISSION TO JAPAN.—On January 26 it was announced that M. Joffe, the Russian diplomat, was to leave China for Japan, on a special mission. The visit of Joffe is connected with that of the Japanese envoy Kama-Kama, who recently went to Moscow with tentative proposals for evacuation of northern Sakhalin and opening trade relations.

Recent events have convinced the Russians that they hold the winning cards, or are playing them more successfully, and the best informed Soviet officials now say that the only thing that could hinder Russo-Japanese negotiations on the Russians' own terms—which means Japanese evacuation of Sakhalin in the not too distant future—is a general accord between the United States and Japan to parcel out the Western Pacific into spheres of influence on the lines of the Anglo-Russian accord in Persia before the war. This the Russians do not consider probable.—Walter Duranty in *New York Times*, February 16.

REVIEW OF BOOKS

"AN INTRODUCTION TO WORLD POLITICS" By Herbert Adams Gibbons, The Century Company, New York. Price \$4.00.
Review and Interpretation

Foreword

On behalf of the Naval Institute, the review of this book was undertaken. In reviewing it, the thought has been that it was written for naval men to read. I have therefore taken the liberty of reading a little more into this article, in the shape of naval lessons, than a strict review would warrant.

W. V. PRATT,
Rear Admiral, U. S. N.

It is rarely that one runs across a book so full of historical material and so useful, in an educational sense to the older naval man. The author has truly said that this is an introduction to world politics. Of the very nature of things, one book could not be more than that, but the arrangement is such that a clear and continuous picture of world political events, particularly those of Continental Europe, is given to the thoughtful reader. In addition to the facts which the author so succinctly presents, he gives his own views of the results of the application of world politics to the various nations and races of this earth. To this extent the book is more than an introduction, it is at least a partial attempt at an interpretation of world politics. If one may glean what is the author's definition, it might be said that world politics is the game of national interests played by the powers of Europe since the end of the eighteenth century. The birthplace of the game was Europe. Minor and backward nations have been the pawns. The players were statesmen. The world was the game board, but the controlling threads always lead back to Europe.

It is necessary to remember the above conception of world politics if one is to apply the lessons of the past to the problems of the future, for it indicates clearly that no American, brought up in a country singularly free from the influences which have controlled the policies of Continental Europe for over one hundred years, can, in the realm of world politics, on equal terms, cope with the foreign diplomats and statesmen who breathe this atmosphere from childhood on, and who sharpen their first set of diplomatic teeth on the problems of the Near East.

This book is of much value to the naval officer who is interested in the study of international questions and who wishes to have a correct background upon which to base his naval strategic studies. It does not replace Mahan, but it does furnish a setting in which we see portrayed the naval

lessons Mahan so skilfully drew out of the history of the past. While not viewing his problem in the light of a naval man, or even necessarily being in sympathy with him, the author has made such a clear analysis of the relationship existing between naval strength and world politics, as it was played in Continental Europe, that he has practically arrived at the same conclusions which Mahan, our great sea strategist, reached. Before attempting to read the book at length, it is recommended that some study be given to the list of contents in order that one may get an idea of the general scheme, or perhaps it might be said, the atmosphere of the book. Ancient history is not touched, though it, particularly Roman world history, furnishes lessons pertinent to the present age. Little space is given to the older colonial conquests of the British, Spanish, French, Portuguese, or Dutch. No attempt is made to form a connecting link between the limited political aspirations of nations before the French Revolution and the world politics of the more imperialistic age following after. In reading this book one should not attempt to find world politics explained or justified by any continuous thread which runs back through a long past. The Spanish and Portuguese relations to their Colonies were so different from the conceptions of world power which came into being about the time of the French Revolution, and which have existed since then, that they have been barely touched upon. Insofar as the scope of the book is concerned, this would be unnecessary if, in some of his later chapters, the author had not appeared to interpret world politics with a view to deriving lessons applicable to international problems of the future. The instant we attempt to speculate about the future it is inevitable that the United States and other countries of North and South America should become involved. The history of the colonial expansion of North, and particularly South America, is so interwoven with the older world policies of Spain, Portugal, and France, that it is impossible for the political atmosphere of the new world not to be tinged with the policies and practices of an older time. So it may be said of North and South America that they, at a period before the one so intimately analyzed by the author, acquired a political complexion of their own, which later as independent states they have proceeded to develop undisturbed to any great extent by the more complex problems which have agitated Europe since the end of the eighteenth century.

Dating from the Act of Vienna in 1815, it may be said that a new colonial policy arose in Europe. Previous to the Napoleonic wars, much of the colonial expansion which had been undertaken, except in North America, was carried on for the purpose of proselytising the natives or of enriching the coffers of the mother country from the stores of gold, silver and other valuables found in the overseas colonies. During this period many wars were fought, but up to the nineteenth century most of the wars were fought for limited objectives. The entire nation rarely felt the full stress and effect of war. The Napoleonic conception of world conquest, resembling somewhat the Roman, changed this situation. His ambitions were unlimited, but his appreciation of the factors constituting world power was faulty. Napoleon never appreciated the true value of colonies or of sea power.

The point to remember is, that following the Napoleonic era, the world gradually became the stage of operations, and the era of world politics was born. After 1815 there came a period devoted to the consolidation of gains; the value of colonies as a world asset to a nation became more thoroughly appreciated and the relationship of sea power to world power recognized. The result was that the colonial expansion after 1815 was of quite a different character from that which antedated the Napoleonic wars. In the inter-relationships existing between national aspirations, colonial expansion, industrial expansion, trade, sea power, and military power, you get the tangled threads out of which the statesmen of the day wove the web of European world politics.

In the discussion of national aims and practices from 1815 to the date of the Washington Conference in 1922, the author has gone as deeply into particulars as was necessary to give his story the thread of continuity. Where details are required, he has referred the reader to the sources of more particular information. However, sufficient data have been given the average reader to follow the trend of the story.

Though modern world politics, in the sense used by the author, has touched North and South America but slightly, its mantle was spread quite definitely over Asia. It may be that our Continent owes partial immunity to that cycle of political events, the American Revolution, the French Revolution and the Monroe Doctrine. One cannot read this book, or in fact, any history, without seeing that Great Britain has been the dominating factor in modern world politics.

From the beginning of the seventeenth century, Holland had extended her commercial sway into the Far East and into the Americas through the agencies of the Dutch East and West India Companies. Her fleets contested, and for a time successfully, under Tromp and De Ruyter, the supremacy of the seas with Spain and with England. The Napoleonic wars ended disastrously for Holland. Her forced alliance with France gave the British the opportunity to seize much of the overseas holdings of the Dutch as they were helpless against England's sea power. The Dutch East Indies were restored and are today the world's richest island empire.

The battle of Trafalgar in 1805, won by the great Nelson, broke forever the sea power of France and Spain, leaving Great Britain mistress of the seas. Blessed in the possession of many world strategic positions, and in the greatest sea fleet, the road to India lay open. Her other colonial possessions were equally accessible. Wherever the native islander could settle he brought from his native soil a bit of the homeland. These overseas Dominions, settled by native stock, today constitute the strength of the British commonwealth. In colonies such as India, already densely peopled by native races, Great Britain's colonial policies were different. They were administered through various agencies as a part of the property of the Empire, but never enjoyed Dominion rights. British colonial expansion, however, was well in advance of the times, and the territories

over which she ruled, in the main, received a wise administration. Through the impetus given by colonial expansion, it was natural to see a great carrying trade established between the colonies and England. With the disappearance of the American merchant marine following the Civil War, Great Britain had hardly a competitor until the merchant marine of Germany began to make its power felt. With the growth of her colonies, and through the agency of her merchant marine, it was natural that England should develop as a great industrial country, with the trade and money of the world flowing toward her. Her safeguard was the British Fleet. It not only protected Britain's shores, but it backed up her diplomatic efforts in peace, and forced her opponents to strain every effort in war. Her own resources up to the time of the Great War had never been taxed to the utmost. In time, Great Britain practically took the middleman's toll of the commerce of the world. Afterwards came Russia, France, Italy, and other lesser powers, and at a later date, Germany. But, whether the exploiting nation were governed by an autocrat, or administered under the laws of a republic, or of a constitutional monarch, the aims have not been dissimilar. At the root of each national policy was the controlling idea that the native peoples might be exploited for the benefit of the mother country. As a by-product, in the processes of exploitation, the native populations, where such existed, were supposed to be benefited by the superior civilization of the greater power. It was not the difference of aims, but the difference of methods used, and the character of the colonizing stock, which made Great Britain's colonies successful in contrast to the colonies under the jurisdiction of other powers. In a practical sense, while the colonies of Great Britain have advanced, those of the other great powers have not kept pace. The awakening sense of national and racial consciousness which is making itself felt, particularly in Asia, will force the world politics of the past to come to a different adjustment of values in the future. The Continent of Asia has not been free from the influence of world politics to the same extent as have the North and South Americas, and in the future may present many interesting and complex international problems. As the French and the English have in the past been the greatest exponents of world politics, so they are at present. The problems of the Near East are today but a continuation of the problems which have been vexing the Balkan and other neighboring states for centuries. The relationship of France and England to these questions, is today, on the whole, what it was in the past before Germany entered the scene. The policy of Russia, owing to the great débâcle, has been completely overturned. At one period in her history she appeared like a giantess endeavoring to shake herself loose from the bonds which bound her, in an attempt to seek an outlet to the four seas. This striving to gain access to the seas usually conflicted with the policy of Great Britain, that could brook no power which might threaten her sea supremacy. The interests of France lay sometimes with one and sometimes with the other power, but in the main, France aspired to be a dominant continental power while England aimed to control the seas.

With the Americas closed to European colonization projects, and with Asia preempted by native races, Africa loomed large in the world political horizon. The Suez Canal opened a short road to India. French and British interests clashed at intervals. In emulation of France, Italy took over to herself certain holdings in Northern Africa, on the Red Sea, and Gulf of Aden. Portugal, Belgium, Spain, and later Germany, appropriated vast territories. The clash of national interests was felt from time to time.

The Balkans and Near East were always fruitful sources of trouble. Wave after wave of conquest had swept over this part of Europe and Asia Minor. Racial and boundary difficulties had vexed the Balkans for centuries. When the great powers started playing one small nation against another, in the game of world politics, fresh fuel was added to the flames. Two late wars had pitted the Balkan states against the Turk and then against each other.

Germany and Japan came late. Germany had been too engrossed in her own problems of internal development and consolidation to seize upon the valuable outlying possessions of the world, when the opportunity to grasp them was good. Under the guiding statesmanship of Bismarck, the German Empire, in a manner somewhat similar to Russia under the autocratic régime, was to expand outwardly from the Empire as a center. The natural direction of expansion was toward the East and Southeast, and this led to the desirability of reasonably friendly relations with the great Empire of Russia and to close ties with Austria. With the passing away of Bismarck conceptions of correct German policy, the lessons gleaned from a study of British methods took firm hold on the directing German imagination. The nature and value of sea power began to be understood. But the world was small. The best unoccupied places had already been preempted, and there arose, naturally, a state of tension when another competitor entered into the field of European ambitions. So long as the clash of interests occurred in overseas possessions, while the danger of war was ever present, it was not inevitable. But the instant that commercial rivalry became too great, and Germany's sea power menacing, the danger grew. When Germany directed her attentions and interests to the Near East, always the source of Europe's troubles, war was almost inevitable. In pursuing her line of conduct, Germany took a leaf out of the history of England and France. But she had neither the political astuteness nor the backing of experience, to enable her to play the game as skilfully as it had been played before. The author is inclined to excuse Germany on the ground of precedent. It would seem fair, perhaps, to excuse German aims; yet the German methods were, to say the least, unsportsmanlike.

Japan, as a world power, also arrived late in the world political arena. Her acquaintance with modern occidental civilization of less than a century's growth, could not be thorough. To a young power, spreading its wings and learning to fly under the modern methods of world politics, it must have been apparent that the law of nations was the law of force.

At least, this is the conclusion which a nation studying European methods of the past century and a half must arrive at. Probably for these reasons the author has made excuses for the attitude of Japan toward Korea and China.

The Russo-Japanese War marked an epoch in Asiatic political history and showed Japan her military strength, which she was not slow to use for her own ends, during the late war. It seems fair to believe, however, that no country like Japan, with over two thousand years of splendid continuous historical or traditional record behind it; of a racial purity and imbued with sterling qualities; with a national spirit which permeates the Empire, will in the end draw conclusions from the historical lessons of the past which do not accord with the future advance of civilization.

Toward the end of the nineteenth century and with the rise of Germany, there developed a competition for the markets of the world which resulted in intensive production and a consequent industrial inflation. This industrial inflation affected many of the white races, inducing a tendency to move away from the soil, and to gather in cities. There they could engage in occupations which apparently gave a larger share of the luxuries of life. Other nations were ready to see the advantages enjoyed by Great Britain, and were quick to follow her lead; but the best spaces of the world already had been preempted. Although wars, as for example our Spanish War, which first brought America into the realm of world politics, and the Russo-Japanese War, which marks the turn of the tide in Asiatic policy, had been fought, no great European War between the powers had taken place since the Franco-German War of 1870. There had been, however, warnings from time to time that the state of peace in Europe was not resting on stable foundations. The intense commercial and political rivalries of the early twentieth century furnish the foreground of a picture, of which the background is made up of national aspirations pursuing selfish ends for over a century of world political history. Finally a combination of interests aligned Great Britain, France and Russia on the one side, and Germany, Austria and Italy on the other.

By 1914 the inflammable materials for war had been accumulated; the train was laid, and it needed only the spark to set Europe ablaze. Serbia furnished the spark. The devastating World War followed. Many of the pre-war policies were submerged for the time being. As is always the case in great crises, an appeal to emotions and to ideals will call to the instincts of man more strongly than do material things. When life and all are staked in the great game, the value of material things vanish. This has been true in the religious wars of the past, and probably will repeat itself in the future. Therefore, it is to be expected that many of the material causes which led to the war, should disappear in the ideals created after the war began. These facts should be kept in mind, for they may help to explain the waning of that idealism, which, binding the Allies firmly during the later and more trying days of the war, began to disappear with the signing of the Armistice.

If we may judge from present and past history, while the other nations of Europe have run somewhat true to form, Russia has been an exception. Even during the war she reversed her policies toward her Allies. It is probable that the great upheaval in Russia marks a new period of European History, as did the French Revolution over a hundred years before it. Students of world politics cannot afford to leave Russia out of the reckoning in dealing with future international conditions. The war has left all of Europe the poorer, and much of it in a chaotic condition. Out of the war have emerged new countries, new national boundaries, new alignments of interests; but the same old national and racial animosities exist, and the same world problems clamor for solution. In certain countries the militaristic spirit still dominates. In others, the birth of a new nationalism is evident. In still others, socialism has run mad. The European world seems to be striving to find a way out, but co-operation is lacking.

With the signing of the Armistice the day of the warrior passed, and the reign of the diplomat and statesman began. Coincident with the passing of the military situation brought into existence by the World War, the idealism which had actuated the men of all the warring nations, began to disappear. The same spirit which had controlled world politics for centuries was responsible for the treaty of Versailles. In the atmosphere of Versailles the League of Nations, conceived as a great ideal and as a solution for the ills which world politics had inflicted upon Europe, started on its world career. Under such conditions it was natural that many of those lofty conceptions should be modified to meet the demands of local interest. America would have none of it. She desired neither to be entangled in European politics, nor to have imposed upon her sovereignty the authority of a super-state. As a panacea for Europe's ills, or those of the world, the League of Nations has not solved the problem. Neither would the problem have been solved had America participated as a member. Unless the spirit which animates the League be different from that which has influenced the world politics of the past, the problem will not be solved after this fashion. Nevertheless, every participant in the Great War has a task to fulfill, which did not cease with the ending of the war. That duty is to see that world conditions are stabilized in the interests of a just and enduring peace, so that civilization may advance, and man live a normal life at peace with his neighbor.

When the Washington Conference was called in 1921, there existed two spheres of world political unrest. One was the Near East, and one the Far East. In the Near East we find the same national animosities, the same clash of interests, that existed before the Great War. Though they strive to keep alive the alliances brought into being during the stress of war, the same national attitudes toward world politics affect France and England today, as they did before Germany grew to be a world power. The problem of the Near East is ages old, and cannot be settled in one generation. In the Far East no enduring political animosities had affected

the relationship between the United States and Japan. Consequently, the question was one far easier of solution than the Near Eastern problem. The way of the Washington Conference may have been a crazy way, but it certainly was a new way, and it was a method which had never been adopted by any of the great powers before, in their dealings with other nations. The atmosphere of the Washington Conference was free from the sinister influences which world politics had imparted to conferences held in Europe. As the initiator of the Conference, it was fitting for the United States to take the lead and to make radical and definite sacrifices, in the interests of stabilizing conditions in the Far East, and of promoting a peace in the Pacific Ocean which should be lasting. Therefore, the national sacrifices made in the interests of stabilizing Far Eastern conditions are not to be measured in dollars and cents or in material values. Their value lies in the imponderables. But it is a fact that through the very material sacrifices which the United States made, a spirit of fairness, of good feeling, of give and take, was created, which has had the result of relieving the tension in the Far East, and may be productive of a peace which, it is hoped, will last for many years. The spirit of the American Open Door policy has received a new lease of life and an impulse, which may make its principles a potent force in the future. Perhaps a way has been paved toward the solution of many perplexing Far Eastern questions. The Conference marks a new departure in world politics, and it indicates a way of adjustment more in keeping with the spirit of the times, the needs of humanity, and the interests of smaller nations, than do the methods which have controlled the world politics of the past.

Perhaps the best and strongest chapter is Chapter XLVII, entitled, "Basis of Solidarity among English Speaking Nations." It is, without doubt, the most constructive chapter in the book. In it the author states, "The creation of a sentiment of solidarity among the peoples of the English speaking world will do more to improve international relationships generally, and to hasten the era of a durable world peace, than any other concrete proposal that has been advanced." The bases of solidarity are: "(1) common laws and the same spirit of administration of justice; (2) similar development of democratic institutions; (3) common ideals, and (4) common interests." This idea of the author is constructive, sane, and sound. It makes no appeal to the racial minorities within our states, nor should it arouse the hostility of those who come to America to become its citizens, obey its laws, and abide by the traditions and principles upon which our great American commonwealth is founded.

In reading between the lines, one cannot fail to see the part which sea power has played in the era of world politics. It has been the power behind national policy. It was the tool of the statesman in peace. It was the weapon which, in the hands of naval men, imposed the will of a nation upon an opponent in war. It twice saved Europe from militarism, and often dictated the terms of peace. It spread occidental civilization over the world. In the future, if America is to play the part in international

questions which her destiny indicates she must play, her sea power will be a potent factor in making her ideals felt.

Finally, the book is sound. In the main, the interpretations by the author, of the lessons learned from world politics, are good. It is a book which should be read by every naval man who wishes to inform himself of the outlines of modern world politics, in order that he may be the better servant of his country in the future. In writing this review it has been the intent to stick to the facts, and to the periods treated in this book. If, in the endeavor to read between the lines and to offer interpretations, this review has differed from the spirit of the author, or has recorded opinions which will not bear the test of analysis, apologies are offered.

LA GUERRE DES CROISEURS, par le Capitaine de Fregate
P. Chack, Du 4 Aout 1914, A La Bataille Des Falkland avec
Atlas, Augustin Challamel, Editeur.

A REVIEW BY REAR ADMIRAL ALBERT GLEAVES, U. S. NAVY

This book is published under the direction of the General Staff of the French Admiralty, and bears the stamp of earnest, painstaking research, and accuracy of detail. It consists of a volume of more than 300 pages, and a separate volume of charts. The period covered is only about eight weeks. Captain Chack was fortunate in having the official histories of the British, German, and Japanese to consult; and to all he makes full acknowledgment. The Japanese account of the Naval War, he states, is in three volumes, but it has not yet reached this country. The well-known Captain Castex of the General Staff has written the preface. It is a graceful foreword to Captain Chack's book, and highly compliments the author on the success of his brilliant labors. The interest and value of the book is heightened by footnotes, telegrams, letters, etc.

The charts deserve special mention. They are admirable, especially in the unique method in which the development of events is presented, each chart covering a period of two weeks, following the outbreak of war. No ship tracks are plotted after the conventional, but for the most part incorrect and misleading custom. In the charts under consideration the cruises of the various ships and divisions are merely indicated by a few colored lines and curves and arrows. Chart I presents the location of the belligerent cruisers during the period of tension up to August 5, and shows the first concentration of the various forces. The *Karlsruhe* is depicted leaving the West Indies; the *Dresden* is standing down the northeast coast of South America; the French and English ships are leaving Mexico, etc. In the Pacific Von Spee with the *Scharnhorst* and *Gneisenau* are in the Caroline Islands awaiting developments, the *Nürnberg* is en route from San Francisco to join him, and the *Leipzig* is on her way up the coast from Mazatlan. The *Königsberg* is between Zanzibar and Aden, and the *Emden* is near Tsingtau. The British Squadron is concentrated

at Hong Kong, the Australian division at Sidney, and the Cape Squadron en route from Mauritius to Dar-es-Salaam. Chart II shows the great ocean trade routes, the focal points of sea-borne traffic, and the zones of observation.

The Atlantic Ocean was divided by the Germans into five zones, I-V. It was divided into eight zones by the British, lettered A-H.

The plan of the book is simple. In a modest introduction the author states the scope of his work. First he tells the story of the German attempt, more or less successful, to prevent the Allies' colonies from sending troops and supplies to Europe, and next he describes in detail the measures taken by the Allies to keep open and safe the principal trade routes, and and at the same time their efforts to capture or destroy the German Merchant Marine. He discusses with remarkable cleverness the confusion into which the finances of the world were thrown by the war, and their profound effect upon the world's economic equilibrium.

A statement of the cruiser forces engaged and their stations overseas is followed by a sketch of the period of tension immediately preceding the declaration of war; this comprises an account of the observation of ports where there were German ships, the concentration of the various squadrons on foreign stations, and the reaction on trade. The succeeding chapters cover the periods of two weeks each, into which the author divides the time covered by the book, in which the various operations of the belligerents are described in detail. The author states that the Japanese history of their naval war with Russia comprises no less than one hundred thirty volumes, as a precedent perhaps for the minute detail of his own history.

"No wars of former times," observes Captain Chack, "have developed such naval effort; no other conflicts, even the most gigantic, will see the result depend so entirely upon the freedom of the seas." On the great ocean routes of trade and their extensions, and in those regions where the density of traffic was greatest was naturally where the heaviest blows would be struck. The British Admiralty was keenly alive to this, and when the war clouds gathered and the British and German cruisers were lying off Vera Cruz in the summer of 1914, it impressed upon Admiral Cradock the importance of keeping in touch with the Germans that they might not escape if war came.

The task allotted to the Allied cruisers was tremendous. They blockaded, visited and examined suspicious ships; convoyed troops, protected merchant marine, patrolled the trade routes, guarded their distant colonies, co-operated with expeditions against the enemy's colonies, and assisted to gain control of the sea. The German cruisers had a simpler, but not less difficult problem; their mission was to isolate the enemy by destroying her commerce.

The insular position of England, and the fact that the richest departments of France had been invaded at the beginning of the war, made both countries more than ever dependent upon the uninterrupted flow

of overseas trade. Therefore the freedom of the sea was a life and death question to them. Thus a tremendous responsibility devolved upon the Allied cruisers, and until the safety of sea transportation was assured, their main objective was the German ships on the high seas.

Captain Chack points out the hard luck the Allies played in at first in their efforts to capture or destroy the German cruisers and swift auxiliaries. Their experience reminds one of the old saying that the English lose every battle but the last. Repeatedly the German ships escaped by narrowest margin. The *Emden* after leaving Tsingtau ran so close to a British squadron in a fog that she crossed their foaming wakes, and again in the Gulf of Bengal she just missed running into the *Hampshire*. It was so in the West Indies at the beginning of the war, when the *Bristol* all but captured the *Karlsruhe*; the ships sighted each other in the moonlight and an indecisive action followed, which ended in the escape of the *Karlsruhe*; and so also in the channelways of Tierra del Fuego when the *Dresden* got away from Admiral Stoddert's ships. In evasion and flight from superior force the Germans showed great skill. The conduct of their cruiser warfare reflects credit on their pre-war plans. They never seemed to experience any trouble in establishing their rendezvous with colliers and supply ships, and they sustained themselves largely on the stores from their prizes.

The most successful of the German commerce destroyers were the *Karlsruhe* and the *Emden*. Each destroyed or captured sixteen British ships, of 72,805 and 70,360 gross tons respectively. The *Kronz-Prince Wilhelm* had 30,728 tons to her credit, and the *Dresden* 11,266.

The author accounts for the difference between the sinkings of the *Karlsruhe* and the *Dresden*, both operating in the same region, by the fact that the ships pursued different methods of cruiser warfare. The *Karlsruhe* reaped a harvest of British ships at the focal point of the trade routes off Cape San Roque; her game was to sink as many ships as possible, and to withhold the news of the work and her own whereabouts to the last moment. The *Dresden* on the other hand contented herself with fewer sinkings, but she spread the news as quickly as possible by sending in immediately the survivors, and hiding herself in the unfrequented waters of the south Atlantic. The *Emden*, though most brilliant of all the sea-wolves, combined the two methods; she equalled the number of captures of the *Karlsruhe* and threw into a panic the entire traffic of the Indian Ocean and the Western Pacific. Captain Chack surmises that both methods were authorized by the German Admiralty, and he inclines to the belief that the *Dresden* method was better in its final effects on the war.

The book is a notable addition to the literature of sea warfare. It is hoped that it will be translated into English by some naval expert, and placed in the library of every ship in commission. It merits a cordial reception by our Naval officers, and the author is to be congratulated on the thoroughness and excellence of his work.

THE WAR IN THE AIR, Vol. I, by Walter Raleigh, Oxford University Press, American Branch. Price \$7.00.

A REVIEW BY REAR ADMIRAL W. A. MOFFET, U. S. NAVY

The history of aviation development is daily in the making. Within the past ten years the possibilities of conquering the air have only been envisioned if we are to judge by the almost daily achievements which are recorded. It is well, however, even in the midst of the rush of present development to pause and survey the past and gain thereby a perspective of the future.

The War in the Air deals intimately and in detail with the development of the British Air Force and as such constitutes a valuable addition to the history of aviation. A painstaking record of this nature is not only of value for the detailed information and facts that it contains but it enables the reader to study from perspective the building of a great war machine under the stimulus of necessity, and clearly presents the difficulties encountered, the heroic efforts put forth to surmount obstacles, and the success which crowned those efforts.

The first chapters are of exceptional general interest. The author traces the development of aviation from the time when men first dreamed of the possibilities of flight down to the successful experiments of the Wright Brothers in this country. In these chapters he has successfully presented the romance of aviation in a narrative style which captivates the interest and stimulates the imagination.

His advocacy of the policy of a United Air Force in Great Britain is somewhat less fortunate in the light of recent events. A defense of this policy, which has of late been under such a withering fire of criticism from all quarters in England, gives a flavor of bias to an otherwise admirable and disinterested work.

THE WASHINGTON CONFERENCE, by Raymond Leslie Buell. (D. Appleton and Company, New York. \$3.00).

A REVIEW BY COLONEL GEORGE C. THORPE, U. S. MARINE CORPS

If there is any need to introduce Raymond Leslie Buell to the American reader, especially after his *Contemporary French Politics*, that introduction might be summarily accomplished by characterizing him as the epitomizer *par excellence* of world politics.

His books cannot fail to impress any cosmopolite with his remarkable capacity for mobilizing facts from the far corners of the earth.

The importance of having all the facts—pertinent facts—available for the one who would estimate a situation is now a quite trite observation for our trained Navy and Army officers. The readers of the *Washington Conference* is impressed with the conviction that Mr. Buell—or Professor

Buell—has illuminated the important international facts against the background of the whole massive conglomeration of years of intrigue and racial strife.

The book is not only blessed with the virtue of logical arrangement but is as intensely interesting—one might say thrilling—as any of the best sellers. It presents a vivid picture of the workings of the master statesmen of the Occident and Orient in Washington assembled for the great conference and it prepares the reader for a true understanding of their parleys by spreading out an elaborate array of important incidents, especially in the Orient, that count as causatives.

For the officer student at our war colleges, either just getting his introduction to the subject of *Policy*, this is precisely the book to show him the fascinating mental exercise he is coming into. And it certainly will make his task easier for, blessing of blessings! it has an appendix that is a veritable encyclopedia of diplomacy *re* the Orient.

Of what immense importance it is that the American public appreciate the purport of these incidents! Hear a quotation from the first paragraph of Chapter I, wherein General Jan Smuts, "one of the most farseeing statesmen of the present day," is represented as declaring that "the problems of the Pacific are to my mind the world problems of the next fifty years or more," thus verifying the prognostications of an American statesman of nearly a century earlier. General Smuts' statement is the more significant in having been made at the last Imperial Conference of the British Empire. He was merely tolling the funeral bells for the departed *first-class* powers of Europe who may be theosophically coming forth in a new birth as second-class brats.

One need not assume an abstruse attitude of mind, nor yet stimulate the imagination, in perusing the *Washington Conference*, to see with perfect clearness that the great theater is now the Pacific and that our own fair Columbia is the dazzling *prima donna*. In fact, we see her coming into her own quietly and gracefully, with no climber effort, scarcely aware of all her alluring power to impose her will. Without effort, a great duty of leadership is imposed upon her—who is so capable and qualified for world leadership, and so endowed with resources to sustain that great position.

This tacit tender of leadership has been foreseen by the cosmopolitan lookers-on for some time and there has been much gossip as to just what modest Columbia, the Fair, would do about it. In some quarters it even has been whispered that she might play the prude.

The situation reminds one, indeed, of incidents of the brilliant society world of the American, English, French metropolis, such as occur when a great dowager-social-dictator passes on to a better world. Who will succeed her in social leadership? Madam B——? Well, of course, it is her logical right of place, but she is so retiring! cares more for domesticity than for society, abhors gossip and social intrigue, etc. The season approaches, arrives. Madame B—— sets all conjecture at rest by issuing

invitations for a brilliant ball for the *élite*. The event is the perfection of good taste and is marked by due deference for all the proprieties: just the right people present, exactly the right wines in proper quantities, etc.

The Washington Conference was the stellar event of the season. Madame Columbia did the thing properly: the right people were there and all that. The Conference served a purpose: our Columbia, in the best of taste, modestly and charmingly announced her leadership.

How did the party affect business? That is another story. Read Chapter X and the last section of Chapter IX—the *Crux of the Situation* and *Conclusion as to the Results of the Conference*.

This book should be a textbook at the War Colleges where someone should make an epitome of the salient features and facts for easy and ready digestion in tabloid form. The epitome should be printed at the Government Printing office for distribution to every member of Congress, to publicists, etc. In brief every American voter should read the book itself. As a part of that missionary work, a few further details of its subject matter may not be amiss.

For instance, the first chapter bears the attractive caption *Nibbling at Asia*, wherein the reader is served a caustic review of Japanese diplomacy and strategy in Asia, bringing up to the situation when the Conference opened. The alleged fallacy of Japanese pretensions of defensive strategy is exposed. Japan is presented in Manchuria, Shantung, Siberia. The matter of the celebrated Twenty-One Demands is explained as well as Japan's position in the Consortium and in reference to the Open (or Closed) Door. In these thirty-eight pages are some highly spicy bits of gossip which bear down heavily upon Japanese military methods in Manchuria, Mongolia and Siberia, such as the Chientao affair, the Nikolaevsk affair, the Semenoc scandal, and the exposures alleged to have been made by the delegation of the Far Eastern Republic in Washington, January, 1922, in reference to which the French and Japanese representatives denounced the documentary evidence as forgeries. It is mildly suggested that Japan has learned something of imperialistic methods from European chancelleries.

We are next treated to a set of facts about the Japanese argument of an Asiatic Monroe Doctrine and shown how very different Japanese pretensions in that regard are from the American in respect to its Monroe Doctrine. Naval readers will be interested to find the book strictly up-to-date in discussing the Langdon affair and the Wireless concession.

Chapter III explains and discusses Japanese governmental organization in its militaristic import: the power of the military hierarchy, the supremacy of the general staffs, the plutocracy of the military leaders and their control of policies.

All mysteries of the Anglo-Japanese Alliance are clarified as the sun dispels the fog, in Chapter IV. An interesting sidelight to the diplomacy that accomplished this treaty, so much desired by both the Army and

Navy parties in Japan, was the sending of Count Ito to Petrograd to arrange a treaty with Russia at the very time that the Japanese ambassador at London was negotiating for the Anglo-Japanese treaty, the purpose of the Petrograd mission being to hasten the British decision. It is said that this epoch of diplomacy was a masterpiece in the Machiavellian school, and it is worthy of note that Count Hayashi in London and Count Ito in Petrograd were working in sealed compartments: Ito being exceedingly anxious for a Russian understanding and Hayashi quite mystified over the other's activities. England signed.

England had her profit therefrom, but the author strongly intimates that this *entrée* into Occidental society bred Japanese imperialism that must be paid for in good time. It imposed imperialistic responsibilities: and it left England free to deal with Germany in the West. It is said that Japan and England co-operated intimately in working out their joint needs of naval expansion.

The original treaty made in 1902 was revised in 1905, two years before its expiration, permitting the annexation of Korea, making the military obligation universal, and including India within its scope. Whereas, originally England had obligated herself as a military ally only in case of the intervention of a third power, each of the contracting powers in 1905 promised that "If by reason of unprovoked attack or aggressive action, wherever arising, on the part of any other Power or Powers either Contracting Party should be involved in war in defense of its territorial rights or special interests . . . the other Contracting Party will at once come to the assistance of its ally . . ."

In 1911 there occurred one of the most interesting phases of diplomatic history in the negotiation by President Taft and Secretary of State Knox of an arbitration treaty with England. Before it was finally acted upon by the United Senate, the Anglo-Japanese treaty was amended to meet the conditions of the said arbitration treaty. Then the Senate refused full ratification of the latter!

Japan was quite unwilling to accept this attempt to except the United States from the operation of the Anglo-Japanese treaty, and there was a strong feeling in Japan that "Japan is now America's slave and India's policeman."

But as the Senate had virtually killed the arbitration treaty, the article in the Anglo-Japanese treaty exempting nations with which one or both of the Anglo-Japanese allies had an arbitration treaty was inoperative. The British Foreign Office avoided this difficulty by announcing its now-famous interpretation that the treaty concluded between the United States and Great Britain in 1914 would be considered an arbitration treaty in the meaning of the Anglo-Japanese treaty. (The 1914 treaty provided only that the contracting powers should not go to war pending investigation of their mutual disputes by an International Commission.)

The last phase is found in the part played by the British dominions hostile to the Anglo-Japanese alliance.

The story of the Washington Conference itself is, perhaps, as interesting as the gossip about the causes that led up to that momentous assembly.

In conclusion it is quite worthy of note that until recently the literature dealing with Japan available to English speaking readers was overwhelmingly pro-Japanese because writers who could pretend to familiarity with the subject were usually men of long residence in Japan, who naturally were there because they liked Japan or because their interests were allied with Japanese interests, or the writers were Japanese men like Kauwikami who is married to an American.

But it may be remarked that the older writers rather emphasized issues that are now regarded as insignificant, while later writers have reviewed the events of the greater diplomacy and the problems in power.

NOTES AND SKETCHES ON MARINE DIESEL ENGINES, by J. W. M. Sothern, D. Van Nostrand Company, New York. Price \$8.00.

A REVIEW BY COMMANDER E. D. McWHORTER, U. S. NAVY

The author states in the preface that the book is intended purely as a guide and help to engineer officers of motor ships who have been trained on lines of steam practice only and to show that there is no "magic" in the Marine Diesel Engine. The book very ably fulfils the intent of the author. It might be said to go further than the author's intent in two ways; first, it is a valuable reference book for engineer officers of motor ships who have had an average amount of Diesel experience and training and, second, in attempting to remove any idea of "magic" in Sections III and VII, "Practical Operation of Machinery," and "Running Troubles, Their Cause and Remedy," it tends to make many points appear more simple than will actually be found to exist. In other words, it is believed the engineer officer should be shown the importance of taking every opportunity, at the end of voyages or when otherwise available, of referring all matters of maladjustments, repairs, etc., to expert trouble finding and repair squads.

The first Section—"General Definitions and Explanations"—is well conceived and fairly well arranged. It permits one with limited knowledge of the subject to read and understand the book throughout without outside reference.

Section II—"Illustrated Descriptions of Various Types of Marine Diesel Oil Engines" covers the field of British manufactures and some of the most prominent continental manufacturers very thoroughly. It notably lacks mention of description of American types and of many good continental types, especially German. This is probably the fault of the engine builders in not making the information available.

The book is conveniently compiled, easy to read, accurate, and is considered a valuable reference book as concerns the subject of Marine Diesels.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Membership Present Membership, 4,622. Changes since January 1, 1923: New members, 124. Resignations, 42. Deaths, 7. Net Increase, 75.

Members are requested to urge non-members to join, and send subscriptions for the PROCEEDINGS to their friends outside the Service. These may begin with any month desired.

Dues Membership dues (\$3.00) for the year 1923 are payable. Members are urged to remit promptly. Dues continue until the date of receipt of resignation in writing.

Subscription Rates In order to bring the subscription rate more nearly in line with the cost of publication, the Board of Control has increased the subscription rate to \$5.00 per year. A special rate of \$3.50 per year is made to members only (not available to societies or organizations) in order that they may send subscriptions for the PROCEEDINGS to their relatives and friends. (Foreign postage 50 cents extra in all cases). Subscriptions are automatically discontinued at expiration.

Back Issues Membership and subscriptions may start with any month desired. For a limited time, subscriptions or membership may commence with the December, 1922, issue, in order to have a complete file of the interesting article on "Destroyer Experiences" completed in the March issue.

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Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication. In accepting articles for publication, the Institute reserves the right to have such articles revised or rearranged, where necessary, in order to bring them up to the required standard of articles published in the PROCEEDINGS—the cost, if any, to be deducted from the compensation due the author.

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Address orders to: U. S. Naval Institute, Annapolis, Maryland.

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Reprints of Articles Twenty copies of reprints are furnished authors free of charge. Additional copies to the number desired will be furnished at author's expense, provided request is made before going to press.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its fiftieth year of existence. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers upon subjects of interest to the naval profession, as well as by personal support.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of life, regular, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy, subsequent to joining the Institute, will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nomination shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be three dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

Sec. 10. Members in arrears more than three years may, at the discretion of the Board of Control, be dropped for non-payment of dues. Membership continues until a member has been dismissed, dropped, or his resignation in writing has been received.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly. Subscription for non-members, \$3.50; enlisted men, U. S. Navy, \$3.00. Single copies, by purchase, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE, 1924

A prize of two hundred dollars, with a gold medal and a life membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original article on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the article.

On the following pages are given suggested topics. Articles are not limited to these topics and no additional weight will be given an article in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original articles published in the PROCEEDINGS during 1923 shall be eligible for consideration for the prize.

2. No article received after October 1 will be available for publication in 1923. Articles received subsequent to October 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best article published during 1923 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more articles receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. The method adopted by the Board of Control in selecting the Prize Essay is as follows:

(a) Prior to the January meeting of the Board of Control each member will submit to the Secretary and Treasurer a list of the articles published during the year which, in the opinion of that member, are worthy of consideration for prize. From this a summarized list will be prepared giving titles, names of authors, and a number of original lists on which each article appeared.

(b) At the January meeting of the Board of Control this summary will, by discussion, be narrowed down to a second list of not more than ten articles.

(c) Prior to the February meeting of the Board of Control, each member will submit his choice of five articles from the list of ten. These will be summarized as before.

(d) At the February meeting of the Board of Control this final summary will be considered. The Board will then decide by vote which articles shall finally be considered for prize and shall then proceed to determine the relative order of merit.

6. It is requested that all articles submitted be typewritten and in duplicate; articles submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

H. G. S. WALLACE,

Commander, U. S. Navy, Secretary and Treasurer.

SUGGESTED TOPICS FOR ARTICLES

Aviation—Its Present Status and Probable Influence on Strategy and Tactics.

The Anti-Aircraft Problem from the Navy's Viewpoint.

Co-ordination of the Naval Air Force with Other Naval Forces.

Naval Bases, Their Number, Location, and Equipment.

Military Character.

The Relation of Naval Communication to Naval Strategy.

Proportion of National Budget Which Should be Devoted to Naval Expenditures.

The Necessity for Having a Fleet.

Organization of Fleet for War.

The Offensive and Defensive in Gas Warfare.

The Best Protection from Gas Attack.

Naval Gunnery of Today, the Problems of Long Range and Indirect Fire.

Physical Factors in Efficiency.

The Relation between the Navy and the Merchant Marine.

America as a Maritime Nation.

Relation of the Medical Department to a Plans Division.

The Place of Mines in Future Naval Warfare.

A Mobilization Program for the Future.

Morale Building.

The Mission of the Naval Academy in the Molding of Character.

How to Best Educate and Convert the American People to the Need of a Strong National Defense.

The Navy in Battle; Operations of Air, Surface, and Underwater Craft.

Navy Spirit—Its Value to the Service and to the Country.

Based on a Major Ship Strength of Eighteen Dreadnaughts, What Do You Consider a Balanced Navy?

The Future of the Naval Officers' Profession.

The Naval Officer as a Diplomat.

Is the Present System of Training and Education for Officers Satisfactory and Sufficient?

The Rôle of the Navy at Peace.

Training Naval Personnel During the Next Ten Years.

Six Years of Promotion by Selection in U. S. Navy. Its Effect Upon Discipline and Morale.

The Employment of Retired Officers Separated from the Service by Reason of the Age in Grade Feature of the Existing Selection Law.

What Measures Should be Adopted to Create and Maintain a Balanced Enlisted Personnel of 120,000 Men?

Our Future Naval Policy Based on Existing International Treaties.

The Future Naval Continental Shore Establishments.

Shore Duty for Enlisted Men.

The Limits of Specialization in Naval Training.

The Effect of the 5-5-3 Ratio Upon U. S. Naval Strategy in the Eastern Pacific.

Armor or High Speed for Large Surface Vessels?

Airplanes and Submarines Versus Super-Dreadnaughts.

The Navy's Relation to the Nation in World Affairs.

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1911

FOREWORD

There has been, after each of the wars in which we have engaged, and coincident with the relaxing of the war tension, a waning interest in the Navy. In recent years this has been furthered by an organized pacifist propaganda, working both upon the country's inherent idealism and upon the desire for economy, and having as its object disarmament by example. In the conditions now confronting us, this weakening of our first line of defense is a menace to the country's security.

Upon us, as naval officers, falls a part of the burden of keeping before the country at large the interests of the Navy, which are identical with the interests of the United States. Officers of the Navy are called upon to deliver addresses on the Navy, its position, its relation to the country's foreign and domestic policy, its mission in furthering that policy, and its needs.

So many requests have come for information which will be of assistance in the preparation of such addresses, that it seemed desirable to the Board of Control to devote an occasional issue of the "Proceedings" to republishing a few of the best articles which may appear from time to time in the public print, or of the best addresses which may be delivered by distinguished naval officers, setting forth the matured opinion of those in a position to know whereof they speak.

The Board of Control hopes that the articles and addresses herein presented will prove not only interesting in themselves, but of material assistance to the Navy as a whole, in bringing and keeping before the country those matters which are vital to the Navy's welfare.

EDITOR.



U. S. S. CALIFORNIA AT FULL SPEED

UNITED STATES NAVAL INSTITUTE P R O C E E D I N G S

VOL. No. 49, No. 5

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WHOLE No. 243

MAINTENANCE OF THE TREATY NAVY¹

BY ASSISTANT SECRETARY THEODORE ROOSEVELT

In the final analysis, civilization is based on communication. The advance of man has been coincident with man's contact with man. Thought is stimulated by the interchange of ideas and commodities. The importance of communication to a country is proved by the nations in our own time and by countless illustrations in history. The backward communities are those that have but little connection with the world at large. The most savage and barbarous tribes are those that are most isolated and that have been isolated through the ages, and it is on remote islands and in inaccessible jungles that the most primitive peoples are now found. In general, and proving the same rule, the reverse of this holds true. For the great and civilized nations of today and of the past are those whose system of communication is most perfect.

Perhaps the greatest single civilized governmental unit of early days was the Roman Empire. By the same token, it was the Roman Empire which had the best developed system for the transmission of men, ideas and commodities. The Roman roads, for example, are proverbial for their frequency and excellence. On them and over them through the generations swept the tide of traffic of the Roman Empire. Indeed, to the present day these same roads are in many instances still serving their purpose. During the last war, when I was in France, I marched over them

¹ Speech delivered before the National Academy of Political and Social Science, Philadelphia, Pa., 20 January, 1923.

and saw guarding them the remains of the army camps of those days, by which they were protected. The Roman system of communication was perhaps, never equalled, let alone excelled, until within the last hundred fifty years. Their galleys were the fastest, their roads were the shortest and best, their post system, their helio system, remained until comparatively recently, models of a lost efficiency. Through the length and breadth of their vast empire protection was afforded to commerce on land and on sea. To these excellent and well-protected lines of communication, Rome owed in the main part her greatness and her cohesion.

Furthermore, the human race does not stand still. It either advances or slips back. "Where there is no vision, the people perish," and it is through new contacts with others that we reach out for new ideas and new viewpoints. In all of the most brilliant ages of man, thought has been stimulated and fertilized by intercommunication. To it we owe our nation, for it was man's restless progress over uncharted seas and through untamed wildernesses that created our country and developed the civilization of the western hemisphere.

In the past, the two great mediums of communication by which our civilization was built were the land and the sea. Our Navy, indeed all navies, are indissolubly linked with the latter, because for communication by water, protection is necessary. Rights on the sea are as important as the right to travel unmolested on the railroad or down the turnpike. No great country can afford to have them jeopardized, for every great country depends on them not only for advancement, but even for her ability to retain her present level. It is the navies of the big civilized powers that have kept open the lanes of traffic in the world. They have been kept open as against pirates. They have been kept open as against other overbearing nations. History furnishes many instances of this. The Roman records contain many examples. Rome was constantly harrassed by pirates until, under the able administration of Augustus, she swept them from the Mediterranean. The underlying cause of the greatest and most significant wars that Rome met with in her rise to power—those with Carthage—was the domination of the Mediterranean Sea.

English history parallels theirs, and our own annals furnish many similar instances. During the brief one hundred fifty years

of our existence we have executed many operations against pirates. In the early part of the last century, at numerous times our fleet was employed in sweeping the pirates from the Gulf of Mexico and the surrounding waters. Our ships sailed under Decatur to combat piracy in the Mediterranean. Indeed, at this very time, we have vessels in Asiatic waters putting down piracy and protecting our nationals and commodities. Furthermore, two of our wars at least, have been in a measure brought on by the question of our rights on the sea. The War of 1812 and the War with Germany were intertwined in their origin with the rights of our sea-borne traffic and the rights of our sea-faring people.

The merchant marine needs the protection of the Navy; the Navy in time of war needs the supplementary aid of the merchant marine, and the country in peace or war needs both. The Navy is a necessary protector of that all-important adjunct of our great civilization—our communication with the other countries of the world.

In addition, our Navy is our first line of defense. It is the shield which prevents the enemy from striking at our vitals. We are not a militaristic nation. We do not maintain a large army. We depend upon our civilians for our military forces. Our ideal is to "show how civilians can smite with the sword." When war breaks, as it has in the past and as it will again in the future despite all we can do, we have much real work to do before our military organization is in proper shape. It is the Navy that holds the enemy at bay while this preparation is being made. Furthermore when victory is attained, it must be through attack, and to attack it is necessary for us to hold the sea lanes. It is the Navy, therefore, that makes this attack possible. Navies primarily are the safe-guard and defense of those countries who do not desire wars of aggression, but who desire, as all right-thinking countries should, to maintain themselves in a position where they can adequately guard the rights of their citizenship.

The Navy also is the right arm of the State Department. It is through the Navy, in large measure, that the State Department visualizes and translates into action its policies. At this time our naval vessels are stationed from the Mediterranean to Asiatic waters. At this time we have ships cruising near Central and

South America. Our vessels are spread over the seven seas. They are the tangible evidences of the power of the United States. Behind all the pronouncements of our State Department rests the power of our Navy. It is the Navy that turns these pronouncements from simply unsupported statements into matters that must be given the gravest consideration by all nations. Our policies, in truth, are based on the Navy. Indeed, the Navy is the cornerstone on which rest the Monroe Doctrine and the policy of the "open door."

Every day, also, in unconsidered and unrecorded ways, the Navy is working for the good of the country. It is helping us to maintain peace for the people by the respect it inspires. It is spreading our influence over the four quarters of the globe, for trade follows the flag. When one of our vessels steams into a foreign port, the stars and stripes floating over her, she is the outward and visible sign of the spirit and soul of the United States.

Though land and water have been the great mediums of communication in the past and are still at this time, another is now opening up—the air. The past twenty years have turned many of the romances of the past into sober facts. Icarus' tragic death has been and is paralleled by our daring young men who, as pioneers, are developing this new empire. Though air communication is still in its infancy, enough has been done to clearly prove its importance. In this respect too, the Navy's work is important, for naval aeronautics are an integral part of our Navy and we are pushing the development as energetically as we can.

Our Navy at present can be divided roughly into two heads—the shore establishment, and the fleet afloat. The shore establishment has as its mission the service of the fleet afloat. It is composed mainly of yards where the ships are repaired by skilled civilian workmen, many of whom have been in the government service all of their lives. These yards are situated at strategic points on our coasts and in certain of our outlying possessions. Without them, the Navy would be helpless; and radio stations whereby our ships the world over are kept in close contact with the government at Washington. In addition we have manufacturing plants such as our Aircraft Factory at Philadelphia; training depots for the new recruits; supply bases, and other similar developments—all necessary to the maintenance of the compli-

cated and diverse machine of a modern navy. In these shore activities, approximately speaking, fifty thousand civilians are employed.

The fleet afloat is, of course, the main objective and the one to which all efforts are primarily bent. The fleet afloat is now a single fleet under a single admiral. It can be divided roughly into five groups. The first of these is the battleships. They correspond to the infantry in the army. From time immemorial they have formed the backbone of our naval defense. It is the great guns of the capital ships that hammer out victory when the fate of the nation hangs in the balance. Important and vital as the other elements are, they are, in the final analysis, but supplemental arms.

The next group is the auxiliary surface craft. In this group are the light cruisers, the cavalry of the Navy. In peace or in war, they are the far cruising rapid units. It also contains the destroyers. Their main weapon is the torpedo and they screen the great ships in action.

The third group is composed of the submarines, which embody many and diverse functions. They are a constant threat to all fighting units. They can be used for breaking an attack formation. Furthermore, they can scout unsupported by other units and are of great value for laying mines where surface craft dare not penetrate.

The fourth division, aviation, is new and only partially developed, but it will assume an increasingly important rôle as the years go by, and experience and invention eliminate the problems that limit it at present. There are three missions with which naval aviation is charged. It co-operates with the army in coast defense; it operates to a limited extent from the decks of the battleships; and it functions as an auxiliary arm from the aircraft carriers. As battle ranges have now increased to over thirty thousand yards, the use of airplanes in action to observe and report the fall of projectiles has become essential to accuracy of fire against an enemy beyond the horizon. We have at this time two vessels partly constructed which will be aircraft carriers. Their length is greater than that of any other ship in the Navy. Each one of them will carry from seventy to eighty planes, depending upon the type and size of planes. They will accom-

pany the fleet in action. From their decks will rise scouting planes to be used as the eyes of the Admiral, torpedo and bombing planes for attack and fighting planes to repel an enemy aerial attack.

The last important group is the non-combatant auxiliary craft. It is difficult for the average individual to realize just how vessels of this sort are necessary, but a modern battle fleet is helpless without them. Some are specialized and must be a part of the regular Navy. These number such units as hospital ships, supply ships, repair ships and transports. Others are more general in character, and whereas it is necessary to have some of them at all times in commission and on hand, may be supplemented by the merchant marine in time of need. These number such units as oilers, colliers and cargo vessels.

Perhaps the greatest single achievement during the past year, from a naval standpoint, was the limitation of armament treaty. The heart of this treaty is the naval ratio established between the great naval powers, namely, for the United States and Great Britain, 5, Japan, 3, and France and Italy, $1\frac{3}{4}$ each. Concretely, this allows the United States a Navy equal to that of Great Britain and forty per cent greater than that of the next naval power, Japan.

This treaty gives us, for the first time in our history, a definite naval policy. All agree that we should live up to these terms. Therefore, our mission is simple—for though it does not limit all classes of craft, as it was impossible to reach an agreement on certain of the auxiliary types, nevertheless the great powers have taken the spirit embodied therein as a guide, and are handling themselves accordingly. Not only does this treaty stop competition, but in addition, it gives us a definite proposition on which to appear before the American public. Furthermore naval plans inaugurated in conformity with the spirit and letter of the treaty will not, in the future, arouse the suspicions among the countries of the world of ulterior motives which fomented so many of the international troubles of the past.

Our mission in the coming year is to create a balanced and adequate treaty Navy. This country will at all times hold strictly to, not only the letter, but the spirit of the agreement. At no time will we undertake building plans in the unrestricted classes

which could reasonably be said to reopen naval competition. Our endeavor will simply be to put ourselves on a parity with the ratio allowed us.

At this time we have not a treaty Navy. We lack certain essential elements. One of these elements is mine-laying submarines. We have no mine-laying submarines in the United States Navy, and yet this type was proved by the war to be most effective and necessary. War statistics indicate that a very large percentage of the destruction done by submarines can be credited to this type of vessel. Mine-laying is an important part of modern naval warfare. The submarine can lay mines where other craft cannot, because the submarine can operate unobserved where surface craft would infallibly be detected and destroyed. We also have but three scout submarines, the *V-1*, 2 and 3, which are under construction now at the Portsmouth Navy Yard. Even when completed, these submarines will not be of the latest design, and though useful in their way, cannot be compared to units laid down in more recent years. The scout submarine, like the mine-laying submarine, has an important mission which it, and it alone, can accomplish.

For all-around utility, in both peace and war, there is no craft more valuable than the scout cruiser. In this branch of naval architecture the United States is very deficient. We have no modern light cruisers with the exception of the ten which are now building. These cruisers have a displacement of 7,500 tons. The treaty allows a displacement of 10,000 tons for light cruisers. The other chief naval powers are greatly superior to us in their light cruisers, both in total tonnage and in types constructed or under construction.

Before the limitation of armament treaty, the United States, in capital ships, was following a policy of constructing new and additional units, rather than remodeling older units. Other countries had been remodeling the units they had on hand. The treaty, by definitely limiting the number of capital ships, has eliminated the policy formerly pursued by this country. The modernization work in progress in other countries previous to and since the formulation of the treaty has placed the United States in an inferior position insofar as capital ships are concerned. In order to bring ourselves to the parity allowed us, we must undertake a

modernization program. This will involve such things as increased elevation for the guns on certain of the vessels, and anti-aircraft and submarine protection of various types.

To summarize, before we can permit ourselves to state that we are maintaining the treaty Navy, we must build certain mine-laying submarines, certain scout submarines, certain scout cruisers, and modernize along various lines, a portion of our capital ships. As I said before, all nations concerned are abiding by the treaty. The United States, also, in following out the suggestions made, will in no way violate either the spirit or the letter of the treaty. We will not attempt, in the program I have outlined above, to exceed our allotted strength. We believe the limitation of armament treaty to be a great work, not only for our country, but for the world. This treaty was made possible by the fact that we had a powerful Navy. There may be other treaties in the future. If we wish to be considered when such a time arises, we must maintain properly what is allowed us at this time. We believe that the United States stands in the world for both honor and peace. If this stand is to be effective among the nations of the world, we must maintain our treaty Navy adequately. The feeble well wisher amounts to but little in a practical world. In *Pilgrim's Progress*, we admire "Great Heart" not simply because of his fine ideals, but because he had the force to stand against the powers of evil in defense of these ideals. We want no wars. We are not an aggressive nation, but it would be idle and mendacious for me to tell you that there would be no wars. Our freedom, the safety of our families, the institutions we prize, all demand that we maintain our proper defense. I wish to see our country in the future honored and respected. There is one way and one way only that this can be attained, and that is by being strong. I wish to see peace for our country—the peace of the righteous. There is one way and one way only that this can be attained and that is by being strong. For the sake of our children and their children's children, we must build up and then properly maintain our treaty Navy.

THE NAVY¹

BY ADMIRAL R. E. COONTZ, U. S. NAVY, CHIEF OF NAVAL
OPERATIONS

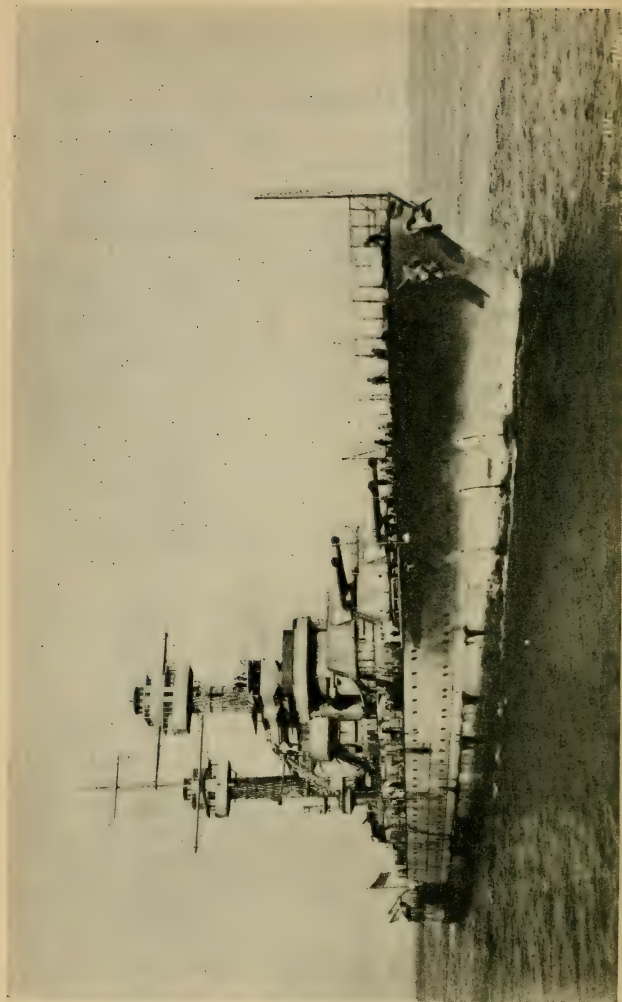
Ladies and Gentlemen :

It is a privilege for me to be allowed to address you tonight at the Marine Exposition on the subject of "The Navy."

The Navy of the United States is your Navy, and we, who have devoted our lives to its development and efficiency, feel that it is most important that each and every one of you take a personal interest in it and ascertain for yourselves more definitely the function it performs for your Government and each of you in your daily lives. Recently, there have been anchored in the North River some of the great modern super-dreadnoughts; practically every afternoon these ships are open for inspection by visitors and I hope that every one of you who has not already done so, will take advantage of the opportunity offered and visit one of these ships, get acquainted with its officers and men and see at first hand how your money is being invested.

During the past year the Navy has held a very prominent place in the public eye. It was almost exactly a year ago today that Secretary Hughes at the opening session of the conference for the limitation of armament startled the world by a proposal to limit the construction of all types of naval vessels according to a certain definite and already established ratio. His proposal in half respects was rejected; the Naval Treaty as signed limited the construction of only two types of ships, namely, the capital ship and the airplane carrier, and imposed certain restrictions as to tonnage and armament of ships of the cruiser class. In making this proposal, Secretary Hughes adopted as a basis the necessity for the maintenance, by the nations concerned, of a navy adequate for national security and defense. Having studied the problem from this point of view, our delegates to this conference enunciated the policy that the Navy of the United States should be

¹ Made over radio phone to the American Association Exposition at New York, November 9, 1922.



U. S. S. MARYLAND

second to none, equal to that of Great Britain and five-thirds times that of Japan. The reasons for the establishment of this ratio are worthy of consideration by every good citizen. The United States Navy has never been used to provoke war; on the contrary an adequate navy has been considered by all of our great statesmen as the surest guaranty of peace. The Navy is the right arm of diplomacy—the protector of our commerce—and the surest means of safeguarding our shores from aggression on the part of an enemy. Therefore, when three of the ablest statesmen in this country, non-military men, laid down as a naval policy for the United States that our Navy should be equal to the strongest and bear certain definite ratios to the navies of other powers, it is my opinion that the great majority of the thinking American public will gladly accept their opinion as the correct one and vote to support a Navy commensurate with that policy. It is of especial interest to shipping interests to see that this policy is carried out for the Navy furnishes the only means by which foreign commerce and commercial lanes may be kept open in time of war.

Let us stop to consider for a moment what is required for the maintenance of the 5-5-3 ratio. Probably many in this audience have at one time or another in their lives played the old American game known as poker; probably many of you have at one time or another held a hand which you considered a winning one, and after considerable backing of this hand have found that some other player in the game held a hand just a little bit better. Those of you who have been through this experience will probably remember that you lost a considerable portion of your stack of chips on it and got no returns whatsoever for your investment.

Let me give you another illustration along this same line: In 1902, Germany came to the realization that if she was to become a great commercial power and maintain colonies at great distance overseas from herself, it would be absolutely necessary for her to develop a large navy as a protection for these interests. Therefore, she outlined the greatest naval building program the world had ever seen and proceeded to build up her navy to a strength greater than that of any other power. Great Britain, however, paralleled Germany's program with an additional one of her own so that in 1914, at the outbreak of the war, Germany found her-

self with a navy *almost big enough*. During the preceding twelve years she had spent hundreds of millions, literally billions of dollars, on this navy and yet at the outbreak of war it was inadequate to its task. Similarly, to the second best poker hand it was a money losing proposition—it paid no dividends on all the millions poured into it. Germany's commerce was swept off the seas, her colonies taken away, her coasts blockaded and all because her navy was only *almost big enough*.

Keeping this example before us I believe there is not a single taxpayer in the United States who would not say "keep the Navy at its treaty strength and ready for emergency at all times." This country is not justified in spending one cent on a navy which in time of need would not be sufficient unto its task. Last April there was an attempt made in the House of Representatives to cut the U. S. Navy personnel to a strength less than that of Japan and two-thirds that of Great Britain, in spite of the fact that the Naval Treaty calling for a 5-5-3 ratio had just been ratified in the Senate. Fortunately, this move was defeated. In that defeat, the country showed that while willing and anxious for limitation of armament by agreement, they were strongly opposed to any such utopian plan of limitation by example.

The maintenance of the 5-5-3 ratio is not one of tonnage alone. Just because a nation has hundreds of thousands of tons of naval vessels tied up in navy yards does not mean that her ratio is being maintained when compared to another navy of equal tonnage which is fully manned and highly trained. A new competition is being emphasized now more than ever before since tonnage of certain classes of vessels has been restricted. This competition is the competition in efficiency, and brings back to mind the old saying which is as true today as the day when made, that "Men fight, not ships."

The only ships which the United States can consider in the discussion of the 5-5-3 ratio, when compared with the active fleets of other powers, are those which are manned and ready, for in these modern days international complications arise so suddenly that there is no time for warlike preparation between the first rumblings and the outbreak of war. We should never forget what happened in 1914. If this country allows her Navy to be greatly reduced in time of peace below that of other nations partic-

ipating in the treaty the outbreak of war would establish for us a virtual blockade of our coasts. Our shores would be open to bombardment and possible invasion. Our commerce would be swept off the seas as was Germany's during the war, until such time as our naval forces could be built up sufficiently to open up commercial lanes once more. During such a period, however, it is hard to attempt to estimate the disastrous military and economic consequences to our country and its one hundred million citizens.

The development of the air forces is assisting materially in the assurance of successful defense of our coasts against fleet attack. For the successful prosecution of any war, however, and the maintenance of our foreign commerce, the well-balanced fleet, of which the capital ship is the backbone is an absolute necessity.

To the layman it is difficult to grasp the magnitude of a modern fleet. First of all in importance of course is the capital ship, which, with its heavy armor and great guns capable of sinking an enemy vessel over the horizon forms the backbone of the fleet. Next in importance comes the destroyer. This type of vessel is used to protect the battleship against submarine attack, to deliver a torpedo attack on the enemy battle line, and to convoy merchant vessels through submarine infested areas. Destroyers are also fitted to lay mines off the enemy coasts. The submarine is another most important type of naval vessel. The common opinion is that the Naval Treaty prohibited its activities in time of war but, as a matter of fact, they are invaluable for many legitimate naval purposes. They form fine scouts and mine-layers because of their ability to operate under the surface of the water. They may attack any armored vessel and capture enemy merchant vessels and in case of armed resistance they may destroy such vessels. The cruiser also is of vital importance to the fleet, and it is in this class of vessels that this country is seriously deficient. The cruisers of the fleet are its eyes; they are spread out in advance of the main body to scout offensively and defensively against the enemy and to obtain and forward to the commander-in-chief information as to the location and disposition of the enemy fleet. At the present time we have no first light cruisers; there are ten under construction, but this total is insignificant when compared to the forty-six cruisers of Great Britain and the great

number now being built by Japan. This type of vessel is also of great importance for its value as a commerce destroyer. You will all remember the havoc raised among Allied shipping by the few German light cruisers which operated for several months until finally chased down and destroyed during the World War. Our inferiority in this type of vessel, in addition to decreasing our fleet efficiency, would be very serious to our merchant marine and to our foreign commerce in event of war.

During the past few years another type of vessel has developed which is of prime importance to a fleet. This vessel is the airplane carrier. An airplane carrier is equipped to carry a great many planes of all descriptions, fighting planes, scouting planes, bombing planes, etc. It has a large flying-off deck from which the planes may rise and to which they can return for replacement of fuel and fighting equipment. At present the United States has but one experimental ship of this character, but is engaged in the conversion of two of the large battle cruisers, required to be scrapped under the Naval Treaty, to this type.

With this fleet of fighting ships must go a large number of auxiliary ships such as hospital ships, repair ships, fuel ships, supply ships, and the like. But even so, such a fleet can only be considered as one of the elements of sea power. Behind the fleet we must have adequate naval bases and an adequate merchant marine. It was Napoleon who said "an army travels on its belly." This simile is as true of a great fleet as it is of an army. A fleet operating away from its home bases requires many times its own number of vessels in the form of a merchant fleet to supply its needs. Without a merchant marine the United States Navy could not leave its own shores in time of war. Conversely, without a Navy the commercial merchant marine could not leave the shores of the United States if engaged in war with any naval power. This mutual interdependence of the Navy and Merchant Marine is very great and cannot be too strongly emphasized. Our country needs them both, and must develop them to a strength second to none.

History has furnished many examples of the fact that national strength and sea power go hand in hand. In 1588 the British Fleet defeated the great Spanish Armada and as a result Spain was forced to relinquish her hold in the Western Hemisphere.

Similarly, the defeat of France by the British Navy forced her to relinquish her holdings in Canada. Still more recently the World War has shown how futile it was for Germany to attempt to become a great colonial power without a navy equal or superior to that of any other country of the world.

The Navy is not only an agent of warfare but is also a great humanitarian agent and commercial developer in time of peace. Just recently you have all read in the papers of the burning of Smyrna and the terrible suffering in that portion of the world. How many of you at the same time noted the small press notice to the effect that twelve additional U. S. destroyers were being rushed from this country to Constantinople, swelling the total there to twenty. The Navy during this period was responsible for the saving of thousands of lives and is similarly at work in all parts of the world as a part of its everyday routine.

The Navy also throughout its entire history has been a great developer of foreign markets and of American business. How many of you know the history of the first naval appropriation ever made in this country? This was in 1794, when the Barbary Coast pirates began making serious depredations into American exports of wheat to the Mediterranean. They would seize a ship, take her into port and levy tribute according to her value. All the nations of the world paid this tribute for years until the little United States Navy was called into being, and opened the Straits of Gibraltar to free passage.

You will remember it was Admiral Perry who in 1854 entered into a commercial treaty with Japan and opened that country to our trade. Correspondingly it was an American naval officer who opened Turkey and China to trade relations with us. In Turkey recently our naval forces have rendered great assistance to our commercial people in that region with the result that our export trade to Turkey has increased from three million dollars in 1914 to more than forty-two million dollars in 1920.

The Navy maintains a patrol force of gunboats on the Yangtze River, and this Yangtze Patrol guards our interests for some 1,700 miles up the river, right into the heart of China. It costs the Navy some \$3,000,000 a year to guard our interests in the Asiatic. In this connection, it might be of interest to note that our exports to China in 1920 were valued at over \$145,000,000.

Naval forces are maintained throughout the Caribbean Sea for the purpose of keeping down revolutions, protecting life, and protecting our commerce. Our trade could hardly exist throughout the West Indies, but for the protection given it by our "Special Service Squadron." Our fruit trade throughout the West Indies is enormous. In 1921, we imported fruit valued at nearly \$50,000,000 and a great part of this came from the countries bordering the Caribbean. The arrangements for transporting perishable fruit have been so perfected by the great American fruit companies that should a dealer in Albany want a large quantity of bananas for the market on say the first day of June, the fruit companies know they are safe in cabling to their big fruit ranches in Costa Rica that this amount can be cut on a certain date as transportation from the ranches to the market in Albany is assured due to the protection of our Special Service Squadron. The result of this whole West Indian patrol so safeguards our trade in the Caribbean that bananas in certain Central American countries can be sold on the fruit stands in New York cheaper than apples which grow in our very back yards. The sailors doing duty in this squadron have dubbed these ships the "banana boats." It costs the Navy some \$3,000,000 to maintain this patrol throughout the West Indies.

The Navy gives direct returns to business interests in other ways as well. It has been the agent for developing to a very great extent the art of shipbuilding. The Navy was directly responsible for the development of steel in the construction of hulls and the discarding of the wood and wrought iron used heretofore. The Navy has been directly responsible for the rapid development of the steel industry in the past forty years. The late Andrew Carnegie once stated that the steel industry of the United States was built on Navy specifications. By this he meant that as far back as 1882 the Navy in its specifications for ships had required that the steel used be made in this country. At that time all steel was being imported but in order to meet this provision in the specifications a small steel plant was started. Since that time the demands of the Navy for quality in steel have been able to keep just a little ahead of the manufacturers' process with the result that today the United States is the leader in the world in quantity and quality of steel produced.

Did any of you ever realize that the first ship to be equipped with electric lights was a ship of the United States Navy? The first ship to be equipped with Diesel engines for its motive power was a Naval vessel. The first ships to be equipped with oil burning installations were Naval vessels. The first ships to be equipped with geared turbines were Naval vessels. The first ships to be equipped with electric drive were Naval vessels.

I am talking to you over the radio phone. Did you know that the development of the radio phone to its present stage is due primarily to the demands of the Navy? As far back as 1907 radio phones had been placed aboard ships of the Navy and their development was being insisted upon by Naval engineers. It was not, however, until our entrance into the war in 1917 that development of this instrument progressed rapidly. At this time the Navy insisted that a satisfactory type be developed and furnished to submarine chasers for intership communication while endeavoring to chase down submarines, and a very satisfactory type was developed by the Western Electric Company. Since that time the development has been very rapid and you are all familiar with the present day uses.

The Navy was the developing agent of the gyroscopic compass which is now rapidly replacing the old magnetic compass on all types of vessels.

The Navy led in the development of watertight subdivision of hulls which has made traveling by water so much safer for all.

The Navy is also developing at the present time a stabilizer or anti-rolling device so that in future years when some of you who are present take a voyage abroad, you perhaps may do so upon a ship which even in the greatest storm will hold perfectly steady and so enable you to eat three meals each day.

In addition to the above mentioned things which have been developed by the Navy for use by commercial vessels the Navy Department is every day rendering service to our commercial interests, all of which helps to make traveling safer and commerce cheaper. The Hydrographic Office of the Navy Department not only supplies all merchant vessels with charts and publications necessary for navigation, but also maintains a service for warning all shipping of navigational dangers such as floating wrecks, icebergs, etc.

The Navy radio is handling messages every day from ships at sea as is shown by the fact that during the past year more than three and three-quarter million words were handled by the Naval Communication Service for the United States Merchant Marine. During the winter months the Naval Communication Service handles on an average thirty S. O. S. distress calls per month, or one a day. The value of this service to the American public as a whole, and to shipping interests in particular, cannot be overestimated. The Navy Radio Stations on the Great Lakes form practically the only means of communication between ship and shore.

One of the developments of the radio has been the radio compass or direction finder. The Navy has established stations equipped with this apparatus at various points along both coasts of the United States near the entrance to harbors. When a ship is approaching one of these harbors in a dense fog and is uncertain of her position all that is necessary for her now to do is to ask two or more radio compass stations for her bearing. Within a couple of minutes she can be given her bearing from these stations and told her position exactly on the chart from which point she can lay a course so as to safely approach the harbor. This system of radio compass stations has had a remarkable record during its few years of operation and has not only saved many ships from destruction but has enabled hundreds of ships to enter port in a fog, where normally they would have had to anchor and wait for clear weather, with the corresponding loss of time in their turn-around period.

The Navy Department has just established at Philadelphia a school in oil burning for civilian marine engineers, so that thoroughly qualified men will be available for our merchant vessels who will make the operation of those vessels safer and more economical.

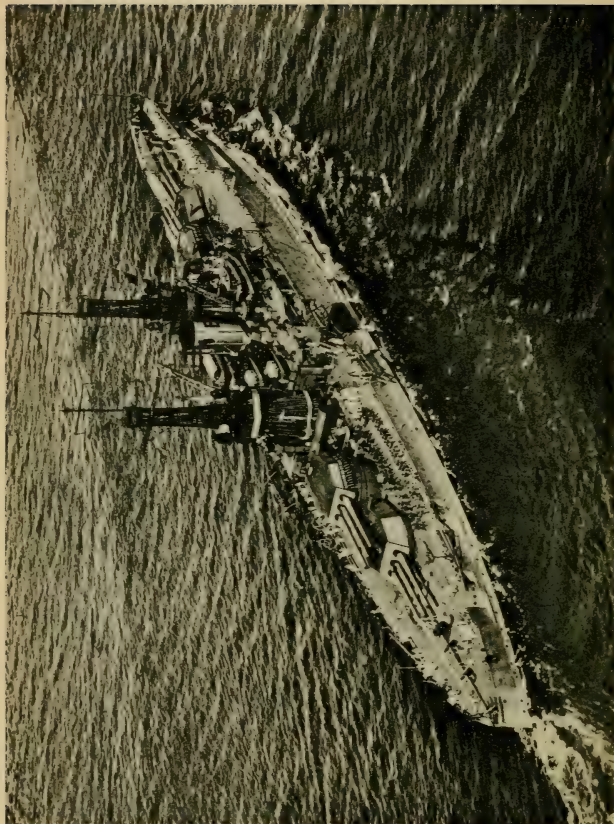
These are some of the things the Navy has done and is doing every day for the Merchant Marine. And in doing these things for the Merchant Marine, the Navy is doing them for the country and for each individual citizen, because all of us are affected by anything tending to safeguard and reduce operating expenses of our fleet of carriers for cargo in which we were interested in 1920 to the huge total of thirteen billion dollars.

More than this, however, the United States Navy, if adequately maintained, stands as positive insurance for the freedom of the seven seas to our commerce. Its annual cost of about 300 million dollars will stand out as remarkably low premium on the insurance of our thirteen billion dollar foreign commerce and our huge investment in shipping.

There are many false ideas as to what portion of one's taxes are chargeable to the Naval Appropriations. In 1920, out of every \$100 paid by a citizen of the United States in all forms of taxes, only forty cents was used to support the Navy. In other words, if there had been no Navy that year, instead of \$100 each citizen would have paid \$99.60. And the difference in cost of maintaining a 100 per cent Treaty Navy as compared with the cost of maintaining one "*almost big enough*," such as Germany had, would have been about five cents per capita. And can you imagine any sane business man risking the insurance on his foreign commerce for the sake of one nickel?

The Naval Appropriation Bill is soon to be presented to Congress. It plans for keeping out of commission hundreds of fighting vessels which we are allowed to maintain at full efficiency under the treaty. The Secretary of the Navy has, after full consideration of the immediate requirements for national economy, recommended the absolute minimum Navy which he considers safe for the United States to keep for this year. Any reduction from this minimum will be most dangerous. The Navy of the United States is your Navy. Get acquainted with it—study its relations to your business needs and after looking at the problem from all angles, ask your representative in Congress to keep it efficient.

It is your Navy—let us keep it a good Navy.



Official Photograph, U. S. Navy

U. S. S. MISSISSIPPI

“A JUST MAN ARMED KEEPETH HIS HOUSE IN ORDER”¹

BY ADMIRAL HILARY P. JONES, U. S. N.

Mr. President and Gentlemen of the National Republican Club:

It seems almost superfluous before such an assemblage as this to argue for the necessity of a Navy, and yet there are so many good people otherwise intelligent in our country who say that we should set an example to the world by doing away with all armaments that we are called upon many times to justify our existence.

The subject you have given me today is National Security and Defense of Our Country. I would prefer to leave out the “defense” and sum it all up in National Security, so that the necessity for defense *per se* will never come. And I believe, that National Security for us means really proper preparedness, for with that it is hard to see how any nation in the world will ever attempt to attack us.

While Mr. Root was Secretary of the War, there was published by authority of the War Department, a book called *The Military Policy of the United States*. That book should be read by every American. In the introductory chapter, the author stated that he was aware that there existed an opinion that such a policy did not exist, but in his subsequent chapters, he clearly proved that there had existed a defined, consistent and most vicious military policy which in spite of its condemnation by every military leader of the American Army since Washington, had been followed by the nation. It has cost us immense sums of money and many lives, and has dragged out our wars most unnecessarily, but the nation has clung to it—a policy of unpreparedness.

We have had no General Upton in the Navy, but a similar book showing equally deplorable results could be written about the Navy. The foundation of our troubles is a doctrine and a fallacy—a doctrine based on self-righteousness, and a fallacy based on a selfish hope. The doctrine was expressed by President Monroe

¹ An address delivered before the National Republican Club, New York, N. Y., January 20, 1923.

in the same message in which he enunciated that other doctrine which goes by his name. It is as follows: "It is only when our rights are invaded or seriously menaced that we resent injuries or make preparations for our defense."

We have lived up to that doctrine. We have gone into every war unprepared. We have seen it develop into a doctrine that it is actually immoral to prepare for war, and have had the spectacle of a high official of the Government thanking God that we were unprepared in 1917. The fallacy is, that every war is to be the last one. After every declaration of peace, our people have apparently assumed that the peace would be eternal, that no more war could come; and now after the Great War, which some phrase has called "The War to End War," there comes from some of our citizens a large demand for the destruction of armament and suggestions that, if we only set an example, the other nations will be moved by our nobility to beat their swords into plough shares, convert their tanks into field tractors, and turn their warships into junk. The advocates of disarmament can visualize the millenium if only their doctrines are followed but cannot or will not see the actual world conditions existing today, I would ask them, "If the example of the United States is so potent, why has it not been followed in the past?" We disarmed in Jefferson's administration; we held our commerce off the seas to avoid conflict; we refused to have commercial intercourse with the belligerents; but we had war forced on us in the next administration. We allowed the Navy to deteriorate between 1815-60; after the Civil War, until the '90s, we were helpless at sea; and yet foreign nations went on building and developing. Is it that our moral influence is greater now than then? And if so, is there not food for thought in the coincidence in our increase of moral force with our increase in naval force, and cannot it be expected that there will be a decrease in our moral force should our navy be abolished?

I heard a story the other day. I do not know whether it is true or not, but it might very well be true for its point is an eternal truth. A Turkish delegate at Lausanne said to one of our observers, "We are much interested in the views of the United States. If you should send an army of 100,000 men to Turkey, we would discuss matters with you; if you should send an army of 200,000 men to Turkey, we would kiss your hands and say to you that you

can have your way ; but in the present circumstances, we shall pay no attention to you!" This illustrates the value of having force available, and of willingness to use that force.

The usefulness of a Navy to a nation is not confined to the actual time of hostilities, but exists in time of profound peace, because of its restraining influence on nations which respond only to force.

As an instance of the futility of merely setting an example, I cite the condition of our merchant marine. To take up this subject may seem digression, but it is not, since the Navy and the merchant marine are so dependent on each other as to constitute one element of the nation's power.

I do not wish to be considered as in any way criticizing, but I would like to give you a plain sailorman's point of view of the condition of our merchant marine, and then leave it to you to judge. The act under which our merchant marine is struggling was written by an able and well-known statesman from Wisconsin with the President of the International Seaman's Union sitting at his elbow. The avowed object of the latter gentleman was to raise the standard of living of sailors of the world—by our example—with what result?

On June 30, 1914, just before the outbreak of the World War, there were only 1,066,000 gross tons of American shipping registered for foreign trade, out of a total tonnage of 7,928,000 gross tons in the American merchant marine—all but these registered ships being engaged in coastwise commerce. These 1,066,000 gross tons of shipping registered for foreign commerce were in 1914 carrying only 9.7 per cent in value of that commerce. On June 30, 1922, the American tonnage registered for foreign commerce, including the war-built vessels of the Shipping Board, amounted to 10,720,451 gross tons, carrying 34.6 per cent of our commerce. Since the end of the war there has been a steady decline in the proportion of American imports and exports conveyed in American vessels—the figures being 42.7 per cent in 1920, 39.8 per cent in 1921 and 34.86 per cent in 1922—that is, in the fiscal year ending June 30, 1922.

That is to say, the American participation in our country's own carrying trade, which reached a maximum of 42.7 per cent in 1920, is now falling at a rate that will very soon leave us as

weak and helpless on the ocean as we were in 1914, unless some vigorous measures are taken to prevent it.

We are at a disadvantage in three points—(1) Our foreign sea-carrying competitors are in possession of the field, with organizations of their own all over the world; (2) all foreign governments in some form, to some degree, subsidize their shipping—either all of it or a part of it—and aid their vessels also in other ways by discrimination against their competitors; (3) American ships, as a rule, pay substantially higher wages and provide more and better food for their officers and seamen than do foreign ships. That is to say, on American ships both wages and subsistence costs are greater than on foreign ships of the same kind, in the same trade. The wage cost of the crew of an average American cargo ship is forty per cent more than the wage cost of a British ship of the same tonnage and general character. This difference in wages alone, to say nothing of subsistence, amounts to about \$1,000 a month, or \$12,000 a year, or four per cent on the capital cost of a 10,000 deadweight-ton cargo steamer, purchased from the Shipping Board at a rate of \$30 a deadweight ton—the price now obtainable.

As to the seaman's law of 1915, it imposes certain discriminations against American ships from which their competitors are free. But that law does not in itself make American ships' wages higher than foreign ship wages—for American ship wages were just about as much higher than foreign wages before 1915 as they are now.

The La Follette law has tended to weaken discipline on American ships, and has been more harmful there than it has in any increase in the American wage rate. Contrary to a popular impression, the La Follette law does not require that a certain proportion of the crews of our ships be American citizens. It does require, however, that seventy-five per cent of the crew in each department shall be able to understand the language of the officers.

Another provision of the La Follette law provides that no men shall have the rating of able seamen unless they have been at sea three years on deck. This is a longer period than is necessary, and the requirement itself in effect discriminates against young Americans in favor of foreigners—as was doubtless intended by the International Seamen's Union, which brought about the enact-

ment of this law, for of the members of this union at that time fully ninety per cent were foreigners.

Of the personnel of our merchant marine forty-seven per cent in the overseas and long-voyage coastwise trade now represents American citizens, native or naturalized—the native Americans heavily predominating. This, however, includes the officers below the rank of master.

Of our actual seagoing merchant marine in the overseas and ocean coastwise trade on December 1, 1922, 1,966 vessels, of 5,826,000 gross tons, were of private ownership, and 1,642 vessels of 7,429,000 gross tons, belonged to the Shipping Board. In this Shipping Board fleet, however, a large amount of defective tonnage not of present commercial value is included—so that probably the privately-owned and the government-owned tonnage of our actual serviceable seagoing fleet are practically equal in amount.

We cannot even convince other peoples of our good intentions, much less lead them to the light.

We have advertised much of the altruistic principles of our nation. We have published to the world through our press the excellence of our motives, and the unselfishness of our natures, but there has been no general acceptance of our protestations by the people of other nations. They seem to conceive that we wish to keep out of trouble and expense.

A survey of world conditions today does not promise stability.

The people of the late warring nations should be war weary, but the spirit of nationalism is as strong as ever. We see force being used to advance national policies, and the new nations arming against each other. The age-long conflict between the Moslem and the Christian is still raging, and the balance of power in Europe is shifting its weights. That overpopulated continent has millions of people who are hungry, while to the eastward is the vast mass of Russia with a population whose culture is Oriental in derivation, dominated by an autocracy which has avowed its enmity to the social structure of civilization. It would seem a time to be prepared for eventualities.

And what is our state of preparedness?

The Limitation of Armaments Treaty, while not yet binding, due to the failure of two nations to ratify, is being carried out

in spirit by the United States. We have even gone beyond its provision in one respect.

This treaty limited the total of capital ship tonnage, the total of aircraft carrier tonnage and the size of capital ships, aircraft carriers and cruisers. There is no limit on the number of cruisers, destroyers, submarines or auxiliaries.

Before the Limitation of Armament Conference, the programs of the contracting powers and their financial resources were such, that in 1925, the United States would have had an overwhelming superiority in capital ships. That potential superiority we sacrificed. We sacrificed further the right to equip bases in the Western Pacific. We gave up immeasurably more than any other power. In fact the United States and Japan are the only powers that really sacrificed anything, and Japan was made safe from any threat from us by the sacrifice of our bases. In our present position we must contemplate adopting the defensive rôle of "a fleet in being." We are even debarred from commerce destroying, unless we adopt the German System; for we are woefully weak in cruisers.

I said we have carried out the treaty in spirit. While we have not actually scrapped all the capital ships named for scrapping, we have destroyed the fighting power of a number of the old ships by destroying their guns, and laid the others up out of commission where nature's deterioration will soon render them useless. We have stopped work on the new capital ships named for scrapping.

Where we have gone beyond the spirit of the treaty has been in our reduction of personnel to 86,000 men. To place us on a parity with Great Britain and preserve the 5-3 ratio with Japan, we should have 120,000 men. This weakness of ours is all the more marked when we take into consideration that the term of enlistment in our Navy is from two to four years, that it is twelve years in the British Navy, and that the other signatories, Japan, France, and Italy, have compulsory service and large reserves. Great Britain of course has an enormous naval reserve.

All over the world today, we are in contact with foreign peoples. We are seeking markets; our fellow citizens working abroad and in competition with citizens and subjects of foreign states. Large amounts of capital and the livelihood of a large number of our people are involved. In the adjustment of the difficulties which

are bound to arise from these conditions the United States should enter the discussion as an equal and not as an inferior. And we shall be inferior if we neglect our Navy. We must be strong enough to make arbitration more profitable to our competitor than fighting.

I beg of you not to be deceived by a dream of eternal peace. The same passions, prejudices and selfishness exist today as have always existed, and will have similar results. This nation of ours achieved its independence, preserved its integrity, and extended its borders, by force. If we are to enjoy the fruits of the labors of our fathers, we must be prepared to use the same instrument.

"A Just Man Armed Keepeth His House in Order." .



Photo by Todd Shipyards Corp.

U. S. S. OMAHA

THE LIMITATION OF ARMAMENT AT THE CONFERENCE OF WASHINGTON¹

BY REAR ADMIRAL H. S. KNAPP, U. S. N., (RETIRED)

The limitation of land armaments may be dismissed with a word, no such limitation having resulted from the conference except in one small particular—that of retaining the status quo in insular coast defenses, contained in Art. XIX of the treaty “limiting *naval* armaments.” A good reason for the failure to limit land armaments existed from the first in the fact that Russia and Poland, having two of the largest armies of the world, were not represented. Premier Briand’s speech gave the *coup de grace* to any hope of action at Washington. In what follows, therefore, the discussion will be confined to naval armaments.

Naval strength is always comparative with that of other naval nations. It is frankly from this restricted viewpoint—the comparative military position in which the Navy of the United States is left—that the limitation of armament by the Washington Conference is considered in this paper. The gains from the Conference as a whole may be worth all they have cost to our military position; but that cost is real, as will appear later on.

A convenient method of examination will be a comparison of the proposal put forward by the Secretary of State on November 12, 1921, with the actual accomplishments of the treaty. Reduced to its lowest terms, the proposal consists of the following main points definitely stated:

(1) Limitation of the total tonnage of capital ships (battleships and battle cruisers) for each of the signatories. This was established.

(2) Limitation of the size of future capital ship units. This was established.

¹ Address delivered April 27, 1922, before the American Society of International Law, Washington, and published in its Proceedings.

(3) Limitation for each of the signatories of the total tonnage of auxiliary combatant ships classified as follows:

- (a) surface vessels and
- (b) submarines, neither of which class was limited, and
- (c) airplane carriers, which class was limited.

(4) Limitation of the size of guns to be carried on board auxiliary combatant ships; this was established.

(5) Restrictions upon disposal and building of all classes of combatant ships, as follows:

- (a) no disposal for use in another navy, which was accomplished.
- (b) no acquisition from foreign sources, which was partially accomplished, but not entirely.
- (c) no building for foreign account, which failed of accomplishment.

The ratio of the floating naval strength to result eventually between the signatories from the acceptance of the American proposal did not appear therein as a definitely stated feature; none the less, the ratio is there, a very important feature, deducible from the tabulations of the proposed allowed strength in each of the several combatant classes, for each of the signatories of the three principal naval powers. It was accomplished in part, for capital ships and aircraft carriers only.

Another feature of the proposal that was not definitely stated was the abolition of competition, but the idea lay behind the whole program. It was not so much armaments themselves that had brought the world to the point of exasperation as it was the swollen armaments resulting from competition. Some armament is recognized as a necessity by all but a few extremists; and in this connection it will be recalled that the President of the United States, before the Conference met, took occasion to warn the nation that the Conference was not one for disarmament but for the limitation of armaments. The treaty abolishes competition in two classes only, battleships and aircraft carriers. These are the most expensive ships to build because of the great tonnage of units; but they are not the most expensive per ton. In the cruiser, flotilla leader, destroyer and submarine classes, the nations are free to continue competition, untrammelled by the treaty except

for the restrictions placed upon the size of individual units (10,000 tons) and the caliber of guns (eight inches). In passing, it may be noted that competition in the past has not been confined to total tonnage or numbers; it has existed in the design of ships and guns, each nation endeavoring to obtain greater offensive and defensive powers in new designs. Unrestricted competition in design has resulted in constant increases in size of both ships and guns. There is no reasonable objection to competition in design within fixed limitations, such as are provided in part by the treaty, but not entirely; for example competition in design can still go on in the size of destroyers or submarines up to the 10,000-ton limitation and in their armament up to eight inches, as well as in their numbers.

Two other limitations, not mentioned in the proposal, were established by the treaty, both of value because looking toward the general aim of the Conference, and neither objectionable because affecting equally all the signatories. These are the limitation of the size of auxiliary combatant ships (27,000 tons for aircraft carriers and 10,000 tons for all others, which latter is practically a cruiser limitation), and the limitation of the caliber of guns to be carried on board capital ships (sixteen inches). It should be added that regulations for the conversion of merchant vessels, provision for which was declared by the proposal to be a necessity, were established to the small degree of forbidding preparations in time of peace other than stiffening decks for guns not to exceed six inches in caliber.

That the achievements of the treaty are great cannot be denied; it is also undeniable that the American proposal failed of complete success. The most important failure lies in the omission from the treaty of any limitation of the aggregate tonnage of auxiliary combatant ships other than aircraft carriers. This failure carries in its train (a) the partial failure of the principle of the relative ratio of floating strengths, and (b) the failure to put a stop to competition. It is unnecessary to go into the reasons for this failure beyond saying that it is no responsibility of the United States, to whose disadvantage it operates.

Sufficient reference has been made to the failure to stop competition. As regards the ratio, none resulted to accord with the provisions of the proposal in the cruiser, flotilla-leader, destroyer

and submarine classes of auxiliary combatant vessels. The importance of this omission may be appreciated from the fact that our tonnage in these classes is about fifty per cent greater than our capital ship tonnage allowed by the treaty. The proposal contemplated a *total* floating naval strength for each nation in a definite ratio to the total floating naval strength for each of the other signatories; put in another way, the proposal contemplated a definite ratio of balanced navies. The Conference, by confining limitation to two classes only of all that were enumerated in the proposal, vitiated the principle by failing to carry it through. It is a disappointing response to a very generous offer.

The American proposal put forward was an entity, to be accepted as an entity if its aim was to be accomplished. By just so much as it failed of complete acceptance in any important feature did it fail in its aim.

It was not to be expected that the proposal of our Government would be acceptable in every detail; such adjustments as the retention of the *Mutsu* by Japan did not affect the general principle. Nor was it to be expected that some additions to its specific provisions would not be made; such were the limitation of the size of auxiliary combatant units and of the caliber of guns carried on board capital ships, both of which appear in the treaty and are useful additions to the provisions of the proposal while neither vitiates the general principle. It was to be expected that no delegation would accept any addition to the proposal that would be a limitation imposing an unbalanced handicap upon the operations of its own floating naval force by comparison with that of one or all of the other nations represented at the Conference.

It is interesting to note the relative tonnages proposed to be scrapped by the American program. In the following comparisons the American tonnage scrapped will be used as the basis, reckoned as 100 per cent, and the order of mention will be United States, Great Britain and Japan in each instance. Considering total capital ship tonnage scrapped, the percentages are, respectively, 100, sixty-nine and fifty-three. This is the comparison usually stressed in non-technical comment, but it is very misleading because it includes for all three nations a number of superannuated ships due already, or about to become due, for scrapping, Conference or no Conference. The fairest comparison is based

upon new tonnage laid down plus that about to be laid down and for which expense had been incurred in the preparation of material; on this basis the respective percentages are 100, twenty-eight and forty-six. The offered sacrifice of the United States was not only the greatest absolutely; it was great out of proportion to the relative ratio of strength proposed to be retained. There is no gainsaying the generosity of the American offer. No further concession was needed to make manifest the sincere attitude of the United States; nor should the United States have been expected or asked to make further concessions—certainly not unless the result would affect all equally and not involve an additional relative sacrifice by the United States.

The concessions offered went further than accorded with the general sentiment of experienced officers of our Navy. Occasion is taken to say here that the general sentiment of American naval officers was not in opposition to limitation, but quite the reverse. That officers were not prepared to go as far as others might was, however, both natural and proper. The Navy is the country's first line of defense, and its personnel deeply feels the responsibility entailed. Its motto for the country is "Safety First"; its duty is far-sighted preparedness—such preparedness as the action of other agencies of the Government may make possible. In advice or action, naval officers have a life-long responsibility for the security of the nation, in which respect they, in common with their brothers of the Army, are in quite a different position from that of any other persons in the Government. Questions of immediate expediency do not have much weight with them, and they are not perhaps so inclined to take chances with national security as those having a shorter tenure of office. Upon them is bound to fall the brunt of an underestimate of the necessity for defensive measures. That they are conservative is the natural consequence. Their conservatism did not, however, go so far as to lead them into opposition to the principle of limitation of armaments.

Your attention is now invited to one feature of the treaty which is approached with considerable embarrassment in this presence, but which cannot be avoided if my professional opinion of the treaty is to be given with honest fullness. I manifestly cannot speak for the Navy Department; and, while I believe that

my sentiments in what follows are generally shared by experienced brother officers, I do not venture to speak for them, but speak for myself alone.

The opening sentence of Art. XIX of the treaty reads:

The United States, the British Empire and Japan agree that the status quo at the time of the signing of the present Treaty, with regard to fortifications and naval bases, shall be maintained in their respective territories and possessions hereunder.

When the specifications are read all the territories and possessions to which they refer are seen to be insular. The agreement includes everything insular that Japan holds now or may acquire outside of the islands of Japan proper; it includes our Aleutian Islands and everything insular, present or future, under our flag west of the Hawaiian Islands; and it includes Hong Kong and present or future insular holdings of the British Empire east of 110 degrees east longitude, excepting the Canadian Islands, Australia and its territories and New Zealand. It will be noted that the language of the article is "fortifications *and* naval bases," not "fortifications *of* naval bases," which latter would have been much less sweeping. Status quo is defined in the last paragraph as follows:

The maintenance of the status quo under the foregoing provisions implies that no new fortifications or naval bases shall be established in the territories and possessions specified, that no measures shall be taken to increase the existing naval facilities for the repair and maintenance of naval forces, and that no increase shall be made in the coast defenses of the territories and possessions above specified. . . .

An examination will now be made of the equities of this remarkable graft upon the proposal of the Government that called the Conference. The proposal made no mention of naval bases, or naval facilities of bases, or fortifications or coast defenses, and it must be presumed that the omission was deliberately intended after the months of preparation for the Conference.

Mahan gives position, strength and resources as subjects for examination in determining the availability of a situation for a naval base. Actual strength and existing naval facilities will first be considered, in doing which it must be remembered that the details of foreign fortifications are rarely known accurately;

their general scope is, however, usually known or believed to be known.

The United States has in Guam a location for a naval base that is wonderfully situated strategically. To state that its fortifications and equipment are derisible now is to disclose no secret. This is no fault of the Navy which for years has sought in vain for the appropriations to make Guam a secure base. In the Philippines there is another great site for a naval base in the Manila region. The entrance to Manila Bay is fortified, but the fortifications need modernizing and the naval facilities are far from being what would be necessary to support the operations of a fleet in war. To meet a menace to the territories under our flag in the Western Pacific, we need a secure naval base in the Philippines and another intermediate between them and the Hawaiian Islands. While neither Guam nor Manila is in efficient condition to support a fleet in war, up to February 6 last the United States possessed the sovereign right to make them so.

The British have at Hong Kong a naval base now strongly fortified and well provided with supplies and equipment, including drydocks, either on the island or in the leased territory of Kowloon on the mainland just across a narrow channel. Hong Kong is ceded territory; Kowloon is leased only. Yet the two are really a whole for British purposes, and Kowloon does not fall under the inhibition of Art. XIX, for it is not insular. In the convention of June 9, 1898, between Great Britain and China for the extension for ninety-nine years of what was therein designated as the "Hong Kong territory" although the extension was entirely on the Kowloon—mainland—side, the right to erect fortifications is recognized. As far as Art. XIX under consideration goes, the right is not denied to the British to fortify and increase naval facilities on the Kowloon side at Hong Kong. It is evident that the British exercised no self-denial in subscribing to Art. XIX.

Japan has fortified Kolung in the northern end of Formosa; and in the Pescadores Islands west of Formosa she is believed to have a strongly fortified and well equipped base, for light vessels at least and probably for all classes of ships. And, what is most important, these bases are only about one thousand miles from all the support of the homeland, while by comparison Guam is 5,500 and Manila 7,000 miles from our Pacific coast.

Reviewing this phase, it is difficult to discover any trace of equity for the United States in Art. XIX.

Next considering resources, those for naval purposes in the islands themselves may be regarded fairly enough as roughly equal for all three nations. Practically all resources must come from the home territories to the existing insular bases. Here distance, a function of position, counts heavily for Japan as compared with either the United States or Great Britain; in time of war this advantage would weigh less heavily against Great Britain than against the United States because Japan flanks our route to the Far East but meets that of Great Britain end on. Regarding the equities in the light of resources, the United States again appears to be a loser by Article XIX.

It is, however, in respect of position considered from all sides that the discomfiture of the United States resulting from the status quo is completed. In the unfortunate event of hostilities with Japan, our Philippines are 7,000 miles from our home coast, while only 1,500 miles from her home islands; her outlying islands are at furthest about 1,000 miles from her home islands, while 7,500 miles from our continental coast. Japan's possibilities of attack upon our outlying islands, or of defense of her own outlying islands against attack by us, are immeasurably superior to those of similar action by the United States. No fortifications, no provision of naval facilities, can altogether overcome that handicap; and it was precisely for that reason that a disparity of floating force was an essential feature of the proposal. Naval opinion, in accepting the 5-3 ratio of floating strength between the United States and Japan did so on the basis of the status quo of sovereign right—not the status quo of insular fortifications, naval bases and naval facilities. It had no idea that the latter, if proposed, would be entertained nor the former be yielded. With naval bases in our western islands of the Pacific fully fortified and provided, the 5-3 ratio of floating force would with difficulty enable the United States to maintain parity at sea in those waters; much less would it enable the United States to undertake a policy of aggression, which has never been the aim of the Navy any more than it has been the aim of the general Government. For the defense of our Pacific islands, and with no idea of aggression whatever, secure and well-provided naval bases are necessary.

To surrender the right to go beyond the status quo is to make the defense of our western possessions—their retention—well-nigh hopeless in case of need. Should they fall, their recapture would only be possible at the cost of great treasure and of very tedious and lengthy operations.

As between Great Britain and the United States no such inequality exists between themselves in respect of distance to the Far East as both countries have with Japan.

Regarded from the viewpoint of position—comparative distances—Art. XIX is glaringly inequitable to the United States.

The Japanese doubtless made a sacrifice of national pride in accepting the 5-5-3 ratio of floating strength, which definitely placed them in third position as a naval power. But whatever they sacrificed in that respect, they have more than made up by their success in securing the inclusion of Art. XIX in the treaty. I say their success because I have never heard of the proposal coming from any other source, and all the world knows that the Japanese did make it. At practically no cost to themselves they have secured all that they were actually straining, and were prepared still further to strain, their financial resources to obtain by their ambitious building program, now no longer necessary.

Art. XIX fatally impairs for the United States the 5-3 ratio of floating strength with Japan in so far as the Western Pacific is concerned. The United States has yielded the possibility of naval equality in that region; control she has never sought. It is beside the mark to say that we are as well off as we were before the treaty. That is a half-truth—true only in the material sense; in the sense of sovereignty we have given up the right to better our situation, and that without adequate return—certainly without return in kind. Our military prestige has received a blow; and with the waning of military prestige political prestige wanes also. The treaty may very well mark the beginning of a decreased influence in the Far East, with attendant loss to our proper, if selfish, trade interests, and to our altruistic purpose for China and Siberia.

In closing, permit me to remind you again of what was said at the beginning—that this paper has been prepared from a purely military standpoint. I am not without full appreciation of other considerations, which did not appear, however, to come within

the purview of my invitation to address you. This has been a material estimate of a part of the work of the Conference, aside from whatever its spiritual and imponderable achievement as a whole may prove to be.

INCIDENTS AND PRESENT DAY ASPECTS OF NAVAL STRATEGY¹

BY CAPTAIN FRANK H. SCHOFIELD, U. S. NAVY

In the winter of 1915 while in command of the cruiser *Chester*, I was sent to the West Coast of Africa to lend moral support to the Liberian Government on the occasion of a widespread native revolt. While steaming down the coast one pleasant day, looking for a corrugated iron roof to show through the palm trees and tell me I was off the port of my destination, I was surprised to encounter a long line of native dugout canoes reaching from the shore seaward for miles—each canoe containing two natives and two rifles. Nearby were other canoes peacefully fishing or proceeding to and from the fishing grounds. The shore end of the line was opposite a native village that was at war with its neighbors. The canoes, including those that were fishing, were manned by men of that village tribe. Their enemies were on both sides of them but the jungle was too impenetrable to admit of their joining forces except by way of the sea. One of the enemy tribes was very dependent on fish for food and the one on the other side had to get part of its rice by friendly barter up the coast. Neither of these tribes were very good seamen and knew none too much about canoe building. One of them had recently migrated from the interior to the coast. So when the war broke out the seagoing tribe stretched its line of canoes seaward and whenever a venturesome enemy fisherman put to sea, they took him, and whenever an equally venturesome rice trader came out, they took him, too. Then some days later the canoes of these unfortunates would drift on their home shores, fearfully decorated with the headless trunks of their late occupants. So when the *Chester* came to the canoe line it was lolling lazily in the sun with little to do, and security reigned on the fishing grounds and in the village on the

¹ Address delivered March 3, 1923, before the Army and Navy Institute, New York.



Official Photograph, U. S. Navy

BATTLESHIPS OF THE BATTLE FLEET STEAMING INTO PANAMA BAY TO JOIN THE SCOUTING FLEET

shore while the tribe got ready to deliver the *coup de grace* to their enemies.

It struck me at the time with amazing force that there before me lay all the aims and accomplishments of sea strategy and tactics and sea power in war.

To fight and to overcome in order :

To control the use of the sea for one's self.

To deny it to one's enemies.

To bring the pressure of want on the enemy people.

To mobilize land forces while the sea forces held the enemy in check.

And finally by combined land and sea action to bring the enemy to terms.

No books on naval strategy had ever reached that savage tribe, but the stern fight for existence made the truth unfold before them. They survived. Their enemies became their vassals.

Naval strategy is not something separate and distinct from national life, but it is a part of a whole that we may call national strategy, a whole that is associated with our everyday existence, both in peace and in war, a whole that guards and gives security to our future, through security from invasion, security in travel and trade, security against a lowered standard of living, and in the freedom to deal on equal terms with all the world.

The fundamental idea of naval strategy is that nothing is of any importance either in peace or in war except as it influences events on land. All the fleets in the world may meet in battle and destroy each other and the result will be nothing if that battle does not change what was happening or was to happen on land. In other words, the Navy is important solely because it does influence events on land. Naval strategy always has an objective related to land operations, be they the operations of peace or of war. Whatever the effect of naval strategy may be it is the effect on those who live on or operate upon the land that counts. Naval strategy deals with sea methods but finds its reward in land successes. Too often the casual thinker says it is the business of fleets to fight each other and then assumes he has said it all. Back of every sea battle there is a definite object and that object bears a direct relationship to land warfare. Take the battle of the

Jutland. Why should either side fight? Germany desired access to the sea that she might do two things—starve England out, and open the road for supplies to her own ports. Both were land objectives. So, too, England thought of the land—her distant possessions, her armies in France and the Near East, her vast populations dependent on food that came to them from over seas. The battle was a sea method—its object a final success on land. The Germans required a smashing victory to gain their object. They failed to get it. In terms of the savage tribe and its navy of canoes, the allied navies wouldn't let the Germans fish or go for rice on the sea, and so they had at last to yield.

The spirit of the age is competition at home and abroad. Modern industrialism and modern trade conditions are driving governments irresistibly toward a keener competition than ever before. Propaganda, commercial rate-wars, tariffs, concessions, spheres of interest, mandates, protectorates, and annexations are phases of international competition. Back of all these phases lies peace strategy—both naval and military, because war is the ultimate form of competition.

I shall make no effort to demonstrate to you the necessity for an American navy second to none. That idea is accepted in principle by everyone, but has not yet been realized. There is always opposition to it both at home and abroad; at home for reasons of economy, abroad because a weak American navy is more consistent with the national aims of some of the great powers. You are all familiar with the yearly efforts of the Navy to get appropriations for new ships. That is a part of its peace strategy to build a navy second to none. But the navy has taken other steps than that to help toward its aim of equality with the greatest.

During the Armistice and subsequent peace negotiations in Paris the question arose as to what should be done with the German Fleet. The American Naval Advisory Staff was firm throughout the negotiations for the destruction of that fleet. All other delegations were equally firm for a distribution of that fleet. Americans in very high authority spoke slightly of the naval idea that the German ships should be sunk instead of parcelled out, but there was a sound reason for the American naval stand. The plan of the European negotiators was for the German

Fleet to be added to European navies, and except for a few light craft, none of it to the American Navy. In other words, German and Austrian battleships, submarines and cruisers, were still to float in navies that might some day point hostile guns at America. American naval officers could not see the logic of that arrangement, nor could they see the need for loading an already overburdened world with the support of the great German Navy. Sound American naval strategy demanded that we should not be weakened relatively by victory. There was but one way to accomplish that end—sink the German Fleet. The Germans did us that great service before the negotiators had come to a final decision, and at a time when it seemed as if the generosity of our representatives would weaken our navy immeasurably. Had the plan of the Allies been carried out Great Britain would have come out of the Peace Conference with about fifty-one dreadnaughts, the United States with her own and no more, seventeen. To defeat that plan was equivalent to building probably a dozen capital ships for our navy. Our naval representatives were pushing the principles of peace strategy for a definite end, the preservation of our relative naval strength, a step toward a navy second to none.

The question of relative strengths came up again when it became known that there was to be a Conference for the Limitation of Armaments. Obviously here was an opportunity to gain or to lose much in relative strength. Great Britain looked across the sea and saw that the completion of our building program would wrest the mastery of the sea from her hands. Had I been a British naval strategist, my aim at the Conference would have been:

1st. To do away with the American battleship and battle cruiser building programs, because therein lay America's naval superiority.

2nd. To preserve British superiority in cruisers because with capital ships limited in numbers, the cruiser became a very important item of naval strength, and cruiser superiority meant naval superiority.

These would have been the essentials of my strategy as a British officer.

Had I been a Japanese naval strategist, I would have done all that I could do to keep America from fortifying further her naval positions in the Philippines and Guam, and of operating her naval forces there. I would have tried to consolidate and strengthen Japan's hold in the Far East through making it difficult for America to interfere. I would have seen that American weakness in the Far East was Japan's strength, and would have fought it out on this line.

These are strictly the views of a materialist; they do not deal in the loftier motives of idealism. I am firmly convinced that they represent the views of some of those who negotiated with America around the council table.

America on the other hand was willing to make sacrifices to promote a better feeling in the world—to make the greatest gesture for good will ever made by a nation.

The General Board was called upon to prepare recommendations. It worked nearly six months continuously on this and collateral problems that were before the Conference. In all of its studies and its recommendations it sought to guard our naval position because it believed that this was part and parcel of our national well-being. Equality in naval strength with Great Britain and a certain superiority over the naval strength of Japan were fundamentals of our proposal. The second-to-none ratio was adopted, but we were left with our older instead of the new ships. We had hoped that there would be a limitation of tonnage in all essential classes of fighting ships. That hope was wrecked on "submarine" rocks, and the door left open for competition in very expensive types of ships—submarines, destroyers and cruisers. We regarded the failure to limit all classes of fighting ships as a misfortune, because our chief naval competitors are more free to carry out their naval programs than we shall ever be. In the years to come you are going to hear much about cruisers and submarines if the construction of these types is not limited. Today Japan is spending more money on cruisers and submarines than all the other powers party to the treaty. Its officials explain that labor and economic conditions make this action necessary, but the naval officer looks to results; and he sees a great strengthening of the Japanese Navy, and the dropping behind of America in relative strength.

You've seen something in the press about the necessity for us to modernize our battleships. Here is the reason for that demand.

When the Washington Conference assembled there were two general bases of limitation of armament possible: the British fleet, built and building, and the American fleet, built and building. As the British had built no capital ships during the war to replace older ships, they were under the necessity during the war of keeping their ships, already built, up-to-date in order to have them ready for instant action. Their turret guns had a greater range than our older guns. They built large extensions to the under-water hulls of their ships as defense against torpedoes; and they increased their protection against aircraft bombs, and against gunfire, by thickening their deck armor. We did none of this work on our older ships because we were building all these improvements into our new ships, eighteen in number, and we expected that these ships would soon replace the old ones. So here was a problem in peace strategy, to make our older vessels as good as those abroad. There is but one way to solve that problem. Increase the range of our guns and increase the protection of our ships against torpedoes and aircraft.

It is very reasonable to ask why our guns were not given long enough range in the first place. The answer is that when the earlier ships were built no one thought of battle ranges beyond ten miles. But the use of airplanes has made it possible for us to open battle at twenty miles range, if the guns can be elevated enough to fire that far. It is impossible to see from any ship how shots are falling, if they fall more than ten miles away. You have to get high up in the air to see beyond that range. Then, after you are up where you can see, you must be able to talk back to the firing ship and tell it how to aim—higher or lower, right or left, and how much. The airplane, high in the air, equipped with radio, can see where the shots fall and can direct the ship's fire with accuracy. Two years ago in the plotting room of the battleship *Texas*, well below the water line of that vessel, I sent messages to a spotting plane 6,000 feet up and ten miles away and had replies back and written on a blackboard before my eyes, in an average of seven seconds of time. This result required careful, simple code work and strict training, both within and without the ship. It showed that a new naval battle area was

opening up, the area between ten and seventeen miles from the firing fleet, the area where aircraft would control the fire. That is why we want to increase the angle of elevation of our turret guns. Today, if our battle fleet met the British treaty fleet in action, eighteen British ships could begin firing at and hitting our fleet at ranges where less than one-third of our ships could reply effectively until the range had been reduced several miles. We should ordinarily expect this closing of the range to take not less than half an hour. For half an hour the enemy would have a three to one advantage and if he chose might continue that advantage indefinitely. The Forts of Liege and Namur, the German squadron at Falkland Islands, and the British squadron at Coronel went down before the fire of guns that outranged them. A navy second to none must be able to fire the first shot as well as the last one.

The war caused large numbers of destroyers and submarines to be built. The treaty for limitation of naval armament did not reduce the number of these, so now capital ships find themselves, the world over, confronted by the greatest torpedo menace that has ever existed. There may be as many as sixty torpedoes available even now for firing at each capital ship. Unless these ships are specially protected, three or four torpedoes might put them out of action. Some way has to be found to protect those ships better against torpedoes. The British blister or enlarged outer hull already mentioned seems to be well adapted to the purpose. There is little doubt today that older British ships are twice as well protected against torpedoes as ours of the same date, not because they were better designed in the first place but because of the modernization in this respect that they underwent during and after the war. Fighting ability at sea depends very largely on the ability to take punishment and still stay afloat. Our navy is not second to none if it can't take the blows as well as any.

The menace from aircraft bombs makes it necessary for our oldest ships to have their decks better protected. All of these items will cost us about thirty million dollars just to bring our eighteen capital ships up to an equality of strength with British capital ships.

Germany had but scant opportunity to use her cruisers as raiders during the World War because Great Britain, close by,

blocked her every exit to the open sea. But suppose that Germany had been somewhere on the sea, with wide-spaced ports like our own, there would have been many *Emden* raids instead of two or three—and for each one there would have been needed a superior force to send in pursuit to destroy that cruiser raider. If ever again the United States has to fight a naval war you may expect enemy cruisers to attack our supply ships, our merchant ships, and our transports in every ocean, but especially in that ocean where lies the key to success. So we have to think of how we can meet that menace.

Great Britain has over sixty modern cruisers, every one of which is faster than any vessel we have, except destroyers. Japan has nearly thirty modern cruisers, built or building, that are also faster than any of our vessels. In a few more months we shall have ten new fast vessels to offset these ninety foreign vessels. How would you like it if, during war, in reply to a demand for the protection of our commerce, the Navy Department had to admit that we had but a total of ten cruisers to oppose those ninety and that these were needed to help guard the fleet at sea? Or suppose you were the captain of an American cruiser sent to drive enemy cruisers away from our merchant ships, and each time you sighted an enemy cruiser he showed you a clean pair of heels? You surely would wish for fast and powerful cruisers to do your duty well. It takes years to build them. No navy is "second to none" if its cruisers cannot follow up the victory of its fleet and drive the enemy ships from the sea. The armored ship is never in large enough numbers to undertake this task; the cruiser has to do it—both before and after battle, through the long months of economic pressure on the enemy country and on our own.

The fast merchant ship is always a potential cruiser. A single power in the Atlantic owns fifty-eight fast merchant ships to our nine—a further emphasis on our poverty in cruisers. Peace strategy for us demands cruiser strength equal to that of the British Empire—and one and two-thirds that of Japan. Any less provision is a sacrifice of the principles of the Treaty, and the acceptance of a secondary naval position in the world. Twenty new modern cruisers are required to bring our navy up to treaty ratios. The difference between four and one-fourth per cent

and three per cent on the British debt to us if applied for three years to building American cruisers would supply this deficiency. Incidentally that same little concession to the British, amounting to sixty million dollars a year, will be just enough to build them two super-dreadnaughts per year when they begin their replacement program.

The Washington Conference registered a very emphatic disapproval of the use of submarines in commerce destruction, but the submarine, still in its restricted sphere, is a very important instrument of naval warfare. Of course its principal weapons are the torpedo and the mine. But it has an employment quite independent of the use of those weapons and that is scouting—long distance scouting. A submarine is the only type of moderate speed vessel that may proceed unsupported to hostile waters and remain there to observe enemy movements. A surface vessel would be discovered quickly by the enemy and driven off or sunk, but the submarine can see and not be seen. Recent developments in radio now make it possible for submarines to send radio reports over extremely long distances.

One of the enemies of submarines has been the easily visible wakes of torpedoes when running through the water. They not only betray the presence of the submarine but they indicate the position of the submarine when the torpedo was fired. The torpedo is coming that will leave no trace.

The listening devices have now been so far perfected that submarines may hear vessels long before they are seen and may determine their direction and general character. I remember sitting one day during the war at the listening device and picking up the sound of a distant vessel and then determining its direction. I gave the head piece to the regular operator and asked him what he made out. He confirmed the direction I had determined and then said: "That sounds to me like an American destroyer." I went on deck and scanned the horizon but saw no vessel. Fifteen minutes later we sighted the smoke of a vessel in the indicated direction which proved to be the American destroyer *Aylwin*.

All navies are going to keep on building submarines, and most of those submarines are going to be the big long radius type. The navy that falls behind treaty ratios in efficient submarines falls behind in an essential element of sea power. Japan is building

nearly half a hundred submarines while practically no new submarines have been authorized for the American Navy in the last five years. During that time the mine-laying submarine has been developed and used with great success. It is sure to be an important factor in any future naval war. We are not less than twenty-four submarines below the treaty ratio of submarines built and building.

No survey of the naval weapons of today and of their influence on naval strategy would be complete if the newest of these weapons—aircraft—were omitted. The recent efforts in our navy have been toward getting naval aircraft to sea with the fleet, and toward developing types suitable for the important functions of scouting, bombing, torpedo attack, and fire control. The air forces that will base on shore will add greatly to the defense of the coast. The air forces that go to sea may have many opportunities for surprise attack on enemy fleets and shore positions, and may contribute greatly toward success, but developments to date do not at all warrant the expectation that naval aircraft will displace the fighting ships that sail on the surface of the sea. In this opinion the navy is a unit, aviators as well as those who are not aviators.

The developments of aviation lessen the value of naval bases that are not well removed from foreign territory. If British Columbia, for example, should ever be at war with the United States, the Navy Yard at Puget Sound, Washington, would be within easy range of air attack. In the same way either Bermuda or Jamaica are within possible flight distance of the important naval bases of New York, Philadelphia, Norfolk, Charleston and the Canal Zone. It will be one of the strategic tasks of the future to prevent hostile aircraft from assembling in positions from which they may attack us.

The threat of air attack decided the location of a great American mine base during the World War. We were going to lay a mine barrage across the south end of the Adriatic Sea. The most convenient locality for the mine base was at Corfu, within a few miles of the barrage; but the fact that Corfu was within easy range of air attacks led us to pick Bizerta on the North African Coast, over five hundred miles away. That base had had more than forty thousand dollars spent on it when the Armistice

came. It wouldn't have done to accumulate shiploads of mines in a base where a lucky raid by an enemy might have wiped out the base and delayed the project for months.

Article XIX of the treaty for Limitation of Armament forbids us to strengthen further the defenses or the naval base facilities in Guam, the Aleutian Islands, and the Philippines. Fortifications and naval bases are essential elements of naval strategy. They enable fleets to go, and to go quickly. Fortifications add strength to the Navy—actual strength in actual ships. In naval strategy it is not just ships that count, so much as ships that are in the right place at the right time. Few men realize how greatly suitably spaced, defended advance positions add to the actual naval force present in a given area of operations. One or two illustrations may not be amiss.

We have three important outlying naval positions in the Pacific. One of them is probably secure against attack—Pearl Harbor. The others in Guam and the Philippines are not fully secure at present. Suppose that Pearl Harbor was to be the base of all our naval operations in the Western Pacific, 4,500 miles away, that no other defended position was available to us in attempting to defend our interests in the Western Pacific. Suppose we had ten cruisers of 10,000 miles cruising radius to operate in war in that region. Each of these would burn up nine-tenths of its fuel going to and returning from station and could stay on station a maximum of three days out of forty. That is, the ten cruisers would not be enough to keep a single cruiser constantly on station if it had to come back to Pearl Harbor each time for fuel.

Take these same ten cruisers and base them in Guam, 3,000 miles nearer their station, and, estimating equal efficiency of operation, each one of them would spend fifteen days out of forty on station,—a change in individual ship efficiency due solely to advancing the most advanced fortified and prepared base from Oahu westward to Guam. Fortifications and foresight in this case would mean a demonstrated increase in the efficiency of each cruiser of 400 per cent. It is not good business to have rest billets fifteen days' march behind the fighting line.

I remember having heard Admiral Oliver, of our service, say more than ten years ago, that for the price of a single battleship expended in defenses and facilities at Guam, we might gain the

equivalent of several battleships for all operations in the Western Pacific. This is strictly true. It was recognized by the Japanese in negotiations preceding the treaty for the Limitation of Naval Armament, when they consented to a ratio of 5:3 in capital ships and made that dependent on our acceptance of Article XIX of the treaty, limiting our fortifications and naval bases in the Far East to the status quo. Battleships cannot maintain their efficiency, even in secure harbors, without occasional use of shore repair-and-docking facilities.

The power that has fortified advanced bases can act quickly,—a highly important thing to do. War usually comes swiftly. At its beginning neither side is fully prepared, so that bold steps may be taken successfully then, which later would have no chance at all of success. Admiral Togo knew this when he attacked the Russian ships at Port Arthur the day war was declared. The opportunity was his because fortified bases were near at hand. When months elapse between the declaration of war and the arrival of defending forces in the theater of war, they will find there that their advance will be slow, painful, and costly, where foresight and preparation might, by bringing them swiftly into action, have made success an early certainty. Further, when the naval advance is delayed, fleets are likely to be placed in that most embarrassing of all positions—the necessity of having to fight land forces in order to gain a base for themselves.

Many of you crossed the Atlantic in transports escorted by naval vessels. At the far end of the voyage you found a friendly secure harbor. If ever you cross the ocean with the navy to gain a hostile port, you will understand very vividly what it means not to have secure advance positions.

If anyone asks why fortified outlying naval bases expedite naval action, the answer lies in the extent of the support a great naval expedition requires. As an example, if we were to operate our present naval fighting vessels in a war in the Western Pacific, we would require the service of every oil tanker flying the American flag, an enormous tonnage. Storage tank facilities are useless to us if we erect them where their safety is in question. But make the advance positions secure by fortifications and by garrison, and much of the delay incident to assembling a great merchant fleet of tankers as a preliminary to a naval advance would be

wiped out, because we would accumulate oil at those positions in time of peace. The permanent and secure defense of suitable fuel reserves in advance positions will put more speed into the ships of the fleet advancing to war than any other act of which I know.

The great strength of the British fleet is not alone in its size but in the fact that wherever it goes a friendly, fortified harbor waits there to receive it and supply its needs. America has just two such harbors outside our continental territory, the Canal Zone and Pearl Harbor, and the latter is so small that it cannot hold a quarter of the war-time strength of the fleet. The state of our outlying bases in the Pacific has been such that prompt naval action in support of our outlying territory has been an impossibility. Article XIX of the treaty perpetuates this condition; Japan on the other hand is always in position to act swiftly. What we have given up in this respect is the right to correct a strategic weakness. If by so doing we have brought about an unselfish friendship, where enmity or fear reigned before, then the sacrifice is rewarded. We alone made that sacrifice. So, too, in capital ships—we alone made the sacrifice.

I doubt if any of you ever thought of fortifications as scouts. Imagine for a moment a great fleet out across the Pacific to war. Imagine that all American island possessions have fallen into the hands of the enemy. That fleet then proceeds in the dark. The whole Western Pacific is beyond the closed door and the commander of the fleet cannot know what is happening there. The air is full of noise and rumors, but no one can tell him which are true. What does that commander want to know? Where is the enemy fleet? What harbor may he steer for, there to guard his fleet while refueling? What, in general, is the enemy doing? The investigations of some of his more advanced vessels may light his way a little distance, but he can have no certainty of information at points that are distant from his fleet. But if the essential advanced positions are guarded by fortifications that hold the enemy back, each day he may get the positive information that the harbors they guard are still at his disposal; that the enemy is, or is not, operating in their vicinity. It is hard for us to sense fully the responsibility of an American Fleet commander, taking his war fleet across the ocean to battle. On him alone rests the

responsibility for national success or failure in war. If he fails, the fleet fails and is lost, and the war ends in defeat. For no army may go across the sea that is without a supporting navy. We may defend ourselves at home successfully, but every outlying possession, every distant interest, will yield in war unless the Navy aided by secure positions may fight far from its home bases. Do you wonder that knowing this, we never lose sight of the task that may lie ahead of us, or that while we give our every thought to guarding peace we do it by arranging, so far as we may for success in war?

The strategic developments at the Washington Conference, by limiting the position and the strength of naval bases, have accentuated the importance of building ships capable of the widest ocean movements. When Germany was building her navy she saw clearly that it had to be specially adapted for North Sea fighting. So Admiral Von Tirpitz designed ships of small steaming endurance and put the excess construction weights into protection and battery. Great Britain on the other hand had to look both to the North Sea and to the wide ocean, so her ships were more truly sea-going ships than were the German ships. The three great naval powers that are now left will all turn their attention to blue water navies. Japan has already abandoned her program of small cruisers and small submarines and substituted for it a program of the largest types—capable of visiting our Pacific Coast and returning to Japan without refueling. This is sound strategy, but not good news for us.

Let us turn aside, for a moment, to consider the present Dardanelles situation, for there questions of national policies and national strategy, including fortifications and naval strategy, exist in a very intimately related form.

The vicinity of the Dardanelles has always been one of international tension, incident to the centering there of ethnological conflicts and of highly important land and sea trade routes. All of Europe and much of Asia has been and is still concerned in decisions at the Dardanelles. The Straits are a great public highway provided by nature leading to a sea that washes the shores of Turkey, Russia, Roumania, Bulgaria, and some lesser states, and that receives the waters of five great navigable rivers. This sea, in consequence, does not belong to a single power, as it once did when

Turkey owned all its shores, but belongs to all the world as a part of the highway of trade. Any and every attempt to block or to impede the access of sea-borne commerce to the Black Sea is subversive of world organization and contrary to world interests, as it would set up international pressures and tensions that would lead inevitably to renewed wars. This is more true now than ever before, because the organization of the world is getting to the point now where free inter-communications is a necessity, and where arbitrary interruptions to commerce are calamities.

We can understand more clearly the naval strategy questions at issue in the Near East, if we remember that Russia, potentially one of the greatest of world powers, exports in normal times one-half of all her products via the Black Sea, that she has no other sea outlet comparable in importance with that through the Dardanelles, and that this sea outlet has been, until the present, fortified and guarded against her. The importance of this outlet to Russia will increase greatly with the growth of Russian population and especially with the improvement of Russia's means of internal transportation, so that no solution of the problem that imposes an artificial barrier between Russia and the sea can contain within it the elements of stability. The temporary interests of those now in power in Russia may seem to them best served by a closed door, but this cannot be the permanent advantage of Russia or of other Black Sea powers. These considerations have led to a general acceptance in the past, by the powers and by Turkey, of the principle of freedom of passage through the Straits for the merchant vessels of all nations, but not to a similar freedom of passage for men-of-war. There have been times when men-of-war might pass freely, while at other times, as during all of the recent years, the passage of fighting vessels of real strength has been prohibited by international treaty. These variations in policy were dependent almost wholly upon naval strategy.

When there are no naval powers bordering on the Black Sea, it is to the interest of other powers, and especially to those powers that have political or economic ambitions in the Black Sea, to have the navigation of the Dardanelles open to their vessels of war. They are then able to use force, or the show of force, to further their interests there. But when there is a fleet of importance based within the Black Sea and belonging to a Black Sea power,

it is to the interest of potential enemies to shut that fleet within the Black Sea and deny to it the free navigation of the Dardanelles. These powers are then willing to see the Straits closed to their own ships as well, in order to gain the advantage that freedom from the menace of the Black Sea fleets gives them. The Russian Black Sea fleet could not participate in the Russo-Japanese War because the Straits were closed. This was a well nigh intolerable position for Russia to be placed in, a position which she believed was one of the causes of her defeat. If the Straits are left open, unfortified, and freedom of navigation for vessels of war is assured at all times, the control that fortifications formerly exercised is then shifted to control by ships of war, and, in time of war, the vessels that enter or leave the Black Sea will do so by the consent of the superior naval power in that vicinity. The destruction of the fortifications of the Dardanelles, the opening of the Straits to complete freedom of navigation, will at present inevitably shift the potential control of the Straits from Turkey to Great Britain. At present this freedom of passage is in harmony with British aims, because they desire to penetrate the Black Sea region; but should the time come when Russia rises again to be a great naval power, the policy of Great Britain will change to that which it formerly was, and she will demand that the Straits be closed that Russia may not threaten her route to India and the Far East via the Suez Canal. The decisions at Constantinople are likely to ebb and flow with the fluctuations in power of the interested states.

You see from time to time mention in the press of ideas and inventions that are not made use of by the Navy. It is right that our every shortcoming should be exposed. The public is the great inspector of Government activities. It should know what we do and should speak its mind. The mails bring hundreds of suggestions each day in time of war, and in time of peace the stream flows on. The navy takes special pains to ensure that no really good idea gets away. There are numerous talented officers who give special attention to outside suggestions. I will cite but two instances.

Some years ago an American inventor came forward with a high explosive shell that was designed to do far greater injury to an armored ship than the standard types of armor piercing shell. He received a good deal of legislative aid. Exhaustive ex-

periments were made at government expense. The naval report on the shell was adverse. The responsible officers who refused to use the invention were set down as blind to progress, reactionary, and all that, but this attack did not change their decision; the American Navy continued to be supplied with the best type of armor piercing shell. Not so in a certain foreign navy where the inventor's ideas were adopted. The battle of Jutland witnessed the great trial and final failure of the inventor's theory. A great fleet failed in its mission partly through ineffective ammunition. Not only was the ammunition ineffective, but its replacement encroached on facilities already over-taxed, involving an anxious period of delay in a great war. The names of the alleged reactionary American naval officers were well known in the Press at the time, but years later when the soundness of their judgment was confirmed, no one outside the navy thought of or commended them for the service they had rendered.

One day in the early part of the war, Mr. Ralph C. Brown of Salem, Mass., presented himself at the Navy Department—the Bureau of Ordnance—with a new electrical idea for firing submerged guns. The gun was not practicable, but the principle by which it was to be fired, if applied to a mine, *was* practicable; for it would make a mine that would act even if a ship never touched it but simply came within a certain vertical distance of it. The officer who listened to him, Commander S. P. Fullinwider, U. S. N., let his imagination travel across to the North Sea and visualize a mine barrage from Scotland to Norway that would shut the enemy submarines from the ocean. That mine and that vision became the great reality of the North Sea mine barrage. Don't think that the transition to reality was easy. Months of intense effort on the part of the inventor and of the best technical brains available were necessary to produce the mine that finally was planted in that barrage. A fleet of ships had to be bought and remodelled. Thousands of men trained—an American naval station built in Scotland. You know the result.

I was in London at the time the barrage was begun. It was a favorite remark of certain officers at the British Admiralty that the American barrage was a bluff—that it really would not be effective. Our first five thousand mines were laid over near the Norwegian coast. A day or two afterward three German sub-

marines stood out of the Skager Rak and through the mine field. Next morning wireless reports told of one damaged submarine returning to Kiel, of one that had disappeared after a great explosion, and of a third that was on her way out to sea. After that I did not hear so much about the barrage being a bluff.

We owe a great deal to thinkers and doers outside the service, but when the service opinion is adverse to any specific proposal, I think the public can serve their interests best by the presumption that a life-time devotion to the technical questions of national defense, joined to a responsibility that stays with us through all our life time, qualifies the service to speak with authority on all professional questions.

One of the finest ways of clarifying strategic ideas is by having always in mind a clear conception of what we are really trying to accomplish. When America undertook the great mine barrage across the North Sea, the object to be accomplished was to bar the exit of all German submarines from the North Sea, north about. American naval officers never lost sight of that mission. Their persistent insistence upon it led to some very warm friendly differences with the British. We wanted an unbroken barrage from Norway to Scotland and from the surface of the sea to a depth of three hundred feet—the limit of safe navigation for submarines. The British wanted that barrage to have two surface channels, each forty miles wide for the use of the Grand Fleet and for convoys. One of those channels was to be next to the Norwegian Coast and one next to the Coast of Scotland. There were to be deep mines in those channels, but the surface was to be safe for the passage of vessels. Their plan looked like a half measure to us, and we felt that it would not be long before the enemy knew where the channels were and used them, especially at night. We went ahead laying the barrage in parts where both plans were alike; and by the tenacity of the Americans, and the open-mindedness of the British, the American plan prevailed early enough to cause no delay in its execution.

Still having in mind the necessity for slamming the door in the face of the German and Austrian submarines, we planned to close the exit from the Adriatic Sea from which enemy submarines were operating. It so happened that there was but one place in that area where a thoroughly effective mine barrage could be laid.

The War Plans Section of Admiral Sims' staff knew that this particular place was not acceptable to some of the Allies. The problem was, how to ensure that the accepted plan would place the barrage in that particular place. The Planning Section first drew up a set of specifications for mine barrages in general. These were based on unimpeachable principles. The specifications were submitted formally to the Allied Naval Council, together with the general proposition of an Adriatic barrage. Both were accepted without debate. The whole question, together with the adopted papers, was then referred to a Board of Admirals at Malta, who adopted a plan exactly like that originally proposed by Admiral Sims' staff. The coincidence arose from the fact that the specifications would not admit of any other plan. There is strategy in negotiation as well as in execution. An incident at this Malta conference of admirals is worth mentioning. The Italian admiral said of the proposed barrage—"This is a big undertaking, but our mine force can, because of its excellent training, lay 250 mines a day." Admiral Strauss, the American admiral, replied, "The mine force under my command lays five thousand, five hundred mines in four hours." The Italian admiral reached for his cocked hat, rose and laying his hat and hand on his breast bowed profoundly and sat down. The business of the day proceeded.

A clear vision of the essential requirements of the time led to a decision regarding our transports during the war. There was fear of an attempt by the Germans to raid the transports at sea with battle cruisers. What should be done in case of an attempted raid? More troops were then a vital necessity in France. There were two plans submitted. One plan provided that transports at sea should seek the nearest harbor for refuge. The other called for no interruption in the movement across the Atlantic, but only such changes of course by the convoys at sea as necessary to lead them through the safest zones. The latter plan was adopted, but the hazard of it was reduced by escorting transports with battleships. Sound strategy required the continuous flow of troops, no matter what extra effort was involved, and this could never be realized if we interrupted that flow every time there was a rumor of a raid. I am reminded of what a grizzled old tug captain—a boatswain of the Navy, said when asked why he had

not turned on the "cease firing" signal lights when he saw target practice shells striking the water on both sides of him. "I've been towing targets for years," he said, "and I don't think there would be much night target practice if I turned on the 'cease firing' signal every time a target shell seemed to have been aimed at my tug instead of the target." The strategy of war is something that has to proceed to a conclusion, and it always involves the element of chance. The strategy of peace should be to weigh, to build and to guard against mischance.

There is strategy in small affairs as well as great. Captain Philip Williams, now commanding the battleship *Tennessee*, during the war commanded the cruiser *Chester*, that was engaged in protecting huge convoys of freighters between Gibraltar and Plymouth, England. These were very slow vessels, and always one or more were disposed to straggle. Reiterated orders seemed to have no effect, so one day the *Chester* ran down to a straggler about two miles astern that said she could not keep up. Captain Williams dropped a smoke box astern of her, where she could not see him do it, then ran alongside and shouted, "submarine" through the megaphone and returned immediately to the convoy full speed. He told me the straggling vessel nearly beat him back to the convoy, and that never again that voyage did she fall astern or fail to be most attentive to orders. Her skipper believes to this day that the little smoke showing astern of him, on the surface of the water, was a submarine which he outdistanced on that famous occasion.

In the days of wooden ships, one of ours on the China Station received orders to proceed to a certain Chinese port, to demand redress from the local Governor for the harsh treatment of some American missionaries. A small indemnity was to be collected, and a salute to the American flag required. The ship arrived at the port, and the Captain delivered (with due ceremony) the demands of our Government. He told the Governor that he would expect a prompt and favorable reply. Next morning, having received no reply, the Captain sent his aide to the Governor to say that he had now carried out the first part of his orders, and that should the Governor fail to comply with his demands before twelve o'clock noon of that day, he would be under the painful necessity of executing the second part of his orders.

The aide had no more than returned to the ship after delivering his message when the American flag was run up on shore near the Governor's palace and saluted with twenty-one guns. Immediately afterward, the Governor's barge, with its crew pulling the well-known official goose-step stroke, came alongside with the Governor and the indemnity. Needless to say, the Governor was well received, and his visit was the first of a pleasant exchange of courtesies that occupied the succeeding days. When the visit was over and the ship was sailing away, the Captain's aide ventured to inquire what the second part of the Captain's orders had been. The old man with a broad and satisfied grin pulled the orders out of his pocket and read: "Failing to obtain satisfaction within twenty-four hours of your arrival, you will quit the port and take no further action in the premises." Naval strategy is not confined to the management of fleets or the selection of naval bases.

I do not want to bring this paper to a close without exploding a popular theory regarding the navy. It has become trite to say that the nation's first line of defense is the navy, but it is not true. It is dangerously false. Diplomacy, statesmanship, is the first line of national defense. The bloodless victories won by statesmanship sometimes equal in historical importance the great decisions of war. They are won because of foresight and acumen in appraising the powers of the weapons in reserve, and in providing for their efficient use in the future. The statesman understands that, even in time of profound peace, the readiness of his country for war is the most potent support he has in accomplishing his aims by diplomacy. He realizes further that he advances his own aims best by a skilful and constant strengthening, in a military and naval sense, of the strategic situation of his country. He must be statesman and strategist too. It is only when statesmanship fails, that the navy moves into the front line. When victory comes the navy and army fall back, and the statesman carries on.

At the time work was stopped on our new capital ships, it was estimated that it would have cost three hundred fifteen million dollars to complete them. A survey of our treaty navy, as compared with foreign navies, leads to the unavoidable conclusion that if foreign programs in cruisers and submarines are carried to com-

pletion, America will be unable to attain her treaty ratios in fighting ships for less than three hundred millions of dollars. We have to choose between such an expenditure, and a naval position of marked inferiority. I am sure the navy would be glad to see the problem at least partly solved by a reduction in foreign cruiser and submarine tonnage.

After the treaty for Limitation of Armaments was signed, it fell to the General Board to prepare a naval policy for the United States to fit the new conditions brought about by the treaty. The General Board had the problem under exclusive consideration for three months, holding more extensive hearings on this subject than it has ever held before on any problem. When its work was completed, the policy was written on a single, large sheet of paper and comprehended every phase of naval activity. I think I cannot do better than to make some brief quotations from that policy.

It is naval policy "to create, maintain and operate a navy second to none, in conformity with the ratios for capital ships established by the treaty for Limitation of Naval Armaments."

It is naval policy "to make strength of the navy for battle of primary importance."

It is naval policy "to cultivate friendly and sympathetic relations with the whole world by foreign cruises."

It is naval policy "to support in every possible way American interests, especially the expansion and development of American foreign commerce."

It is naval policy "to co-operate fully and loyally with all departments of the Government."

It is naval policy "to make every effort for economy in expenditures while holding efficiency paramount."

It is naval policy "to have always in mind that a system of outlying naval and commercial bases, suitably distributed, developed and defended, is one of the most important elements of national strength."

These are all strategic steps toward the goal of national welfare. After the Secretary of the Navy had given the policy prolonged study, he approved it and added in his own handwriting at the bottom of the sheet, a publicity policy, which reads as follows:

To give to the public all information not incompatible with military secrecy.

That publicity policy is one of the reasons why I have been able to talk so frankly to you here. I would not be fully frank if I failed to add to these remarks my fear that America is being swept by an emotional generosity and trust in international affairs, that is not consistent with our ultimate well being. I believe that idealism, pitted against commercialism and self-seeking, is bound to lose; and that the correct strategy of the present is for us to be on our guard.

“KEEP OUR NAVY STRONG¹”

BY CAPTAIN LUKE MCNAMEE, U. S. NAVY

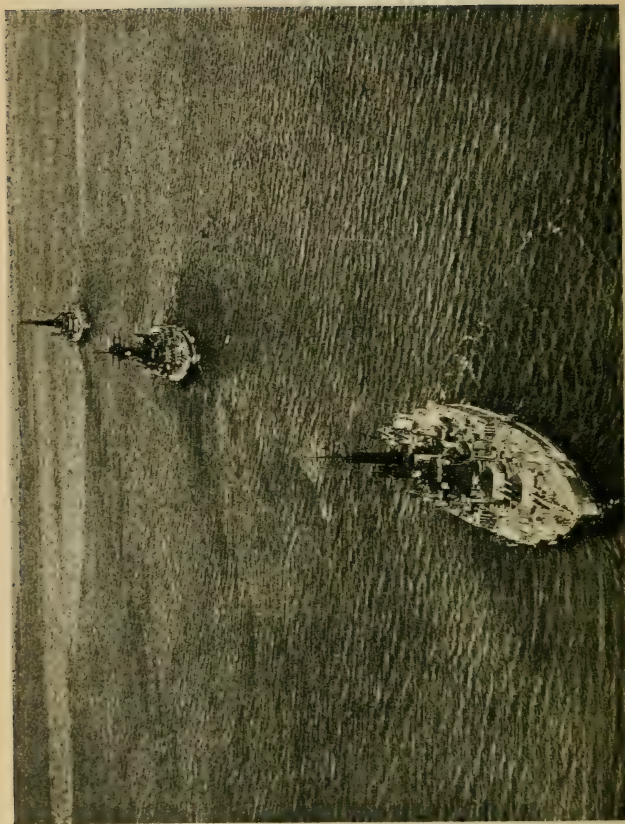
Director of Naval Intelligence

When I was informed by Colonel Roosevelt, Assistant Secretary of the Navy, that I was to be invited to go to Boston and speak to this distinguished audience I must confess to experiencing a feeling of dismay such as I have rarely felt in the presence of much graver danger. This feeling was prompted not so much by my sense of inexperience in public speaking, or doubt of your kindly forbearance, as by the thought that while this would be a wonderful opportunity to present the case for the Navy to an audience whose influence might in the future prove a factor in determining the course of our naval policy, my failure to enlist your interest in the problems of the Navy would be a matter of abiding regret.

The reasons why you should stand firmly in support of the Navy are to me so obvious that I hope no eloquence of mine will be necessary to convince you, once you are in possession of the facts.

What I have to say to you is wholly from the national standpoint. That is the standpoint of the Navy. The Navy is not concerned with party politics. It exists only as an arm of the executive authority whether that authority be Democratic or Republican. We are not interested in the political rivalries of states, or districts, or counties, or municipalities. Of all those things the average voter knows a great deal more than I do. But when our average voter speaks of America as a nation and considers the rights, duties and interests of America as one of a family of nations, a family with many conflicting and discordant interests, his ignorance is apt to be alarming. I think you will agree with me when I say that but a small fraction of our citizens

¹ Speech delivered January 22, 1923, before the Women's Republican Club of Massachusetts.



Official Photograph, U. S. Navy

BATTLESHIP DIVISION COMING TO ANCHOR IN THE BAY OF PANAMA

are qualified to cast an intelligent vote, on any international question, with any clear understanding of the issues involved. I fear that only a few hundred thousand out of our twenty odd million of voters are sufficiently informed to cast a vote that would conserve our national interests and yet the safety of our country must necessarily rest on the knowledge and intelligence of our electorate.

If popular government is not to fail, our voters cannot take up too soon the earnest study of their duties and responsibilities as citizens of America. Our country has become so vast and so diversified in its interests that those voters capable of taking a broad national view of our necessities are in danger of sharing the fate of the dodo. Yet statesmen can accomplish little without your support.

John J. Ingalls once defined a statesman as a successful politician who is dead. We need support for those good men in office who are earnestly striving to be statesmen while yet alive.

I know of no nobler mission for our newly enfranchised women than to start a crusade for better national citizenship, and I know of no better center for such a crusade than this splendid old city of Boston that has cradled so many of our national ideals.

But I am to speak to you of the Navy and surely the Navy's interests are the country's interests.

One of the principal reasons for the adoption of our Constitution was to provide for the common defense. Our fathers decided in their wisdom to provide one Army and one Navy to defend all the people in common, so the Navy belongs to the people as a whole. Each of you is a stockholder in this great organization. Its property is valued at over three billions of dollars. It is not only your right but your duty to share in its management.

Now why should a Navy exist at all? If we go back to first principles, in order to live and prosper we must have law and order. To have law and order, society must be organized and live under some system. As the world is still inhabited by all kinds of people, good, bad, and indifferent, and not as yet by God's white angels, it is necessary that certain physical sanctions be provided to insure obedience to the law. Even the most primitive rural community has in addition to its law book and its justice of the peace, a constable. Now just as in our domestic

relations we must have our federal, state, and municipal police, so in our international relations there must be provided an Army and Navy as a physical sanction of our international laws, conventions, treaties, and policies. Any other conclusion would involve an absurdity. For if, in dealing with each other in our most highly civilized communities we must still rely upon force to guarantee us our just rights, how can we expect to do without force and yet obtain justice from strangers whose interests are not our interests, and who quite naturally are seeking their own advantage? More than one statesman has said "our foreign policy is as strong as the Navy and no stronger."

I will give you an example of how the Navy is used to support our policies. In 1902 Germany made certain demands on Venezuela, which she proposed to enforce by seizing and occupying the ports of that country. The proposal of arbitration by President Roosevelt was rejected by the Kaiser, whereupon Admiral Dewey was placed in command of the fleet and Germany was informed that if any attempt was made at seizure of Venezuelan territory the American Fleet would be instructed to prevent it. The Kaiser saw the point and promptly backed down. His attempt to make the Monroe Doctrine a "scrap of paper" failed because our Navy at that time was stronger than Germany's.

You have all heard people say "What need have we of a Navy? Our country could never be successfully invaded." How foolish! It is not necessary to invade this country to cause war. If one square foot of our territory was taken from us by force, even in the far off Philippines, Guam, or Samoa, we would have to go and get it back if it cost the last dollar and the last drop of blood in the country. If that is not the spirit of America, I would blush to be called an American citizen.

A great British statesman said the other day that Europe might soon be involved again in another great war, and that America would undoubtedly be drawn into it. There is no doubt that we would be drawn into it if some country "fighting for its existence" should commence sinking American cargoes and passengers. There is little danger of such an eventuality as long as we are strong, but we must not forget that the German General Staff in 1917 decided that in our state of unpreparedness they could proceed to sink our ships with impunity, because the war would be

decided before we could get ready to intervene. It is true that they guessed wrong, but it was only thanks to the allies that we were able to take a year and a half off in which to prepare our Army and Navy for war. Our great loss of life and the terrible debt which we as well as the allies incurred, due to this delay, can be directly charged to pacifism and unpreparedness.

You are well aware of what the Navy does in time of war. Our school histories give much space to the spectacular battles and heroes that appeal to the national pride. But little is said of the work of the Navy in time of peace. It is not spectacular; it makes little appeal to the imagination, but the sun never sets upon its activities. In every quarter of the globe in all the seven seas, it is standing guard over your interests.

One of its first missions after we secured our freedom was to destroy piracy in the Mediterranean, that we need no longer pay tribute to the Barbary corsairs to let our wheat enter the ports of Europe. Later our Commodore, proceeding to Turkey, negotiated treaties that opened up the Near East to our trade.

In 1842 our naval commander in Asiatic waters secured from the viceroy a treaty which opened to our trade the five great ports of China.

In 1854 Commodore Perry, by the most brilliant diplomacy, opened Japan to the commerce of the world.

It is a sad commentary on human nature to note what an emphasis a battleship adds to a diplomatic note.

Not a year passes but witnesses the peaceful intervention of our Navy in some port of the world to open up new avenues of trade, to protect our commerce or our interests from irreparable damage. We export annually over seven billion dollars of surplus products that we cannot ourselves consume, and must market abroad if we are to maintain our standards of living and continue our prosperity. Three billions of those products come from the farm, and ultimately find their way to the uttermost parts of the earth. Without a Navy the protection of this gigantic trade, by which we live, would be at the mercy of our competitors.

This trade is the life blood of the nation; it is reckoned in billions. Is it any wonder that the Navy that gives it protection should cost money?

We have a foreign fruit trade of \$50,000,000 in imports, largely built up around the old Boston Fruit Company. Without a Special Service Squadron in West Indian and Central American waters, where the bulk of this fruit comes from, a few revolutions would wreck this business, as well as a business of \$500,000,000 annually in sugar and petroleum.

Our patrols 2,000 miles up the Yangtse Kiang protect from robbery and piracy an export trade in the neighborhood of a hundred millions annually.

Statisticians tell us that we are rapidly exhausting our resources of raw material, that our population is increasing at such a rate that the time is not far distant when we will no longer be self-sustaining and must import our food as well as our materials for manufacture. We are rapidly becoming industrialized. We have almost ceased to export meat and are shipping yearly less wheat and cotton. The time is approaching when our prosperity will depend largely on our ability to compete in the international market with manufactured goods. All history shows that war is but an ultimate form of economic competition. If we are to compete on equal terms, we must have a Navy able to protect our trade. "He who controls the sea controls the world." That is Mahan's dictum. We do not wish to control the sea, but if tradition means anything we are willing to fight for freedom of that sea from the control of anyone.

Sea power has ultimately decided every great war. The World War was no exception. If the Allies had not kept control of the sea, not a man or a pound of food or war munitions could have safely entered a French port. By her sea power England gathered her armies from all over the world, from Australia, New Zealand, India, and Canada. France brought a million and more from her African colonies. America, with the aid of allied shipping, poured her millions of troops into France in time to save the day; but in addition, the open sea permitted us to send the supplies and war materials that saved the allies before we entered the war. Had Germany destroyed the British Fleet at Jutland, the war would have been decided then and there; for without control of the sea neither the British Empire or America could have helped.

Sea power does not consist of a Navy alone. It must be supplemented by a merchant marine and by adequate bases from

which to operate. A modern fleet that is not tied to its base requires an immense train of merchant ships to supply fuel, ammunition, provisions, repair facilities, hospitals, and dozen of other diverse functions. In time of war this service can with certainty be obtained only from one's own flag. The Navy needs the merchant marine and the merchant marine the Navy and the security and prosperity of the country demand both.

Bases are needed to dock and fuel and repair our ships and supply both Navy and merchant ships with their needs in peace and war. Great Britain has great bases all over the world while we have but a few.

If I have shown you why we need a Navy, you will be interested in knowing what should be the size of that Navy. The recent Arms Conference settled the ratio of strength that should exist between the great naval powers, as equality between Great Britain and the United States. The proportion is known as the 5-5-3 ratio, which gives Japan three-fifths of our strength. Unfortunately agreement was reached only in regard to battleships and airplane carriers. Nevertheless the principle of a fixed ratio of relative strength stands approved by the powers and the Secretary of the Navy has formally announced our naval policy to be a Navy second to none and in accordance in all respects with the 5-5-3 ratio. We are deficient in personnel as well as in cruisers, certain types of submarines and aircraft carriers. In addition, our battleships require modernization. There is nothing in the treaty that prevents our having a Navy in entire accordance with our policy, except the willingness of the people to build and maintain it. It is foolish to be satisfied with a Navy nearly good enough. No argument can be advanced to support such a position. Germany had a big Navy—a Navy *nearly* big enough. What happened? Her ships were driven from the sea, locked up in port and she couldn't get a pound of food or supplies in or out of the country. The hundreds of millions that are spent on a Navy are really wasted if the Navy is not capable of defending the country. A weak Navy is only preparedness for defeat—a defeat that would mean humiliation and disaster.

Pacifists and little Navy men are filling the press with statements that the Navy is opposed to another conference that would establish the 5-5-3 ratio for all classes of vessels. I wish to state

most emphatically that the Navy stood squarely behind the Limitation of Arms Treaty so far as it applied to vessels of the Navy, and that the Navy is now anxious to see that ratio applied to every class and type of ship, to officers and men, and to every branch of naval activity.

The trouble is that the pacifists do not really want limitation of armaments by international agreement. What they advocate with "Alice in Wonderland" reasoning is the principle of disarmament by example. They forget that our past adventures in helplessness have never been followed by anyone, and that our unpreparedness for war caused the terrible loss of life and the huge debt we have now accumulated, both directly chargeable to our failure to maintain an armed force adequate to the protection of the country. Every generation in our history has seen kindled the fires of war, but we have stupidly adhered to the policy of delaying the construction of a fire engine until after the fire has started.

I wish to say a word about false propaganda against the Army and Navy. I am repeating no idle rumor when I tell you that much of this propaganda has a sinister foreign source—its object the overthrow of our government and the ultimate dictatorship of the proletariat. A logical step in the procedure of these foreign gentry is the elimination of the forces of law and order—the Army and Navy. This can best be accomplished through the assistance of our own good people who wish to abolish armies and navies, proclaim "No More War" and then, I suppose, place their heads deep in the sand.

I congratulate the propaganda foxes on their ability to utilize our foolishness but I have no fear of their success, once the people become aware of the object they have in view.

A popular fallacy that is heard on all sides is the excessive cost of the Navy and the terrible burden of taxation for armaments. The total tax we paid in 1922 for all purposes was about \$90 per capita. Out of that only \$2.76 went to the Navy. I know it is very painful to have to pay out \$2.76 taxes, but we don't mind how much we spend on having a good time. The newspapers say we spent five billion dollars for Christmas presents. That is a billion dollars more than the whole annual cost of the federal government. We spent about four times the cost of the Navy for tobacco alone. Before prohibition went into effect we drank

nearly twenty gallons of liquor a year for each man, woman and child. I don't know what that cost, but from what my friends tell me, though we may not be drinking as much now, what we do drink costs fully as much as that twenty gallons did; and that would be enough to pay for all the navies in the world.

Another thing we hear is that armaments induce war. I hold no brief for any other country, but for the United States I know that the lack of an Army and Navy has never made our people hesitate to declare war whenever they felt like it. The Army and Navy have nothing to say about declaring war, and I never saw one of them that wanted it. The extent or quality of armament seems at most to have little to do with war. Some of the bloodiest battles of history are those recorded in the Bible, where men fought hand to hand with swords and spears. If we didn't have a single naval vessel we would have to fight with merchant ships, as we did in the Revolution. So would every other country, and the nation with the biggest merchant marine would rule the sea.

Many think that armies and navies exist for the sole purpose of destruction. As a matter of fact our Army and Navy have been the greatest constructive forces in the country. Wherever they go they better local conditions, establish schools, and improve the public health. The Panama Canal, the greatest engineering triumph of the age, was made possible by our Army, and they converted a pest hole into one of the healthiest parts of the world. The peoples of Cuba, Porto Rico, Haiti, San Domingo, the Virgin Islands, the Philippines, Guam, and Samoa have been absolutely regenerated by the Army and the Navy. The Navy has saved ten times as many lives as it has ever taken.

The development of all the intricate machinery and inventions that go into our ships has had more to do with the industrial development of the country than any other agency. The steel industry was literally built up on Navy specifications, Navy laboratory experiments and Navy contracts. The Navy has returned to the country, many times over, every dollar spent on it.

I am for any constructive measure that will bring peace to the world. But peace will never be permanent till we change human nature. Human nature can be changed only by the churches and the schools. The churches and schools cannot function without

law and order, and there can be no law and order without an efficient Army and Navy.

We all pray for peace and live in the hope of the millenium, but until we are assured that peace will remain with us, common prudence requires that we take reasonable measures for our defense. We are a nation potentially powerful on account of our resources, but the prestige that we will enjoy beyond our own borders will be measured by the visible evidence of our strength.

I sat in Paris in the Peace Conference, and I saw the four strongest military powers write a treaty while all the weak powers waited outside to sign on the dotted line when that treaty was completed. I sat in Washington during the Arms Conference, and saw the great naval powers of the world gladly gather there to agree with us that naval armaments should be limited, and that other beneficent treaties should be signed. And I thought, why is it that Switzerland, with complete naval disarmament, or one of a dozen minor powers, filled with altruism but lacking naval strength, did not call this conference? Did the fact that we were powerful on the sea; and were building the greatest Navy in the world, have something to do with it? Possibly. Would those great powers have ignored a call for such a conference by China, a country that is helpless to resist aggression? Possibly. On the whole, have we not learned in five thousand years of history that when statesmen sit down around the council board, the one with the greatest background of armed strength receives the most respectful hearing? I think so.

If we are to retain our prestige; if we are to keep our place as one of the great custodians of civilization; if we are to preserve the heritage of our freedom and our institutions and transmit that heritage unsullied to our descendants; if we are to guard our families and our firesides; let us keep in our hands the power that God has given us, and renounce once and forever the sophistries of the Delilahs of pacifism, that would shear the Navy of its strength.

JAPAN: A SEQUEL TO THE WASHINGTON CONFERENCE¹

BY HECTOR C. BYWATER

I

Sufficient time has now elapsed since the Washington Conference to enable us to gauge the effect of its leading decisions on the naval position of Japan; and a study of this subject is rendered the more opportune in consequence of recent developments in the Far East which seem likely to react upon the naval policies of other powers.

The initial fact that emerges from a survey of the situation today is the patent failure of the Conference to achieve its main purpose, namely, to check the further expansion of sea armaments in any and every shape or form. It has undoubtedly been successful in arresting the multiplication of capital ships, which are at once the most costly and—to the lay mind, at all events—the most aggressive instruments of sea power; but, through causes too notorious to need repetition, it imposed no veto on the building of other combatant types, save airplane carriers, and at least one signatory party has deemed it expedient to take full advantage of this omission. The result is that today, barely twelve months after the acceptance of the Limitation Treaty, a revival of ship-building competition seems inevitable if the balance of power as regulated by that treaty is to be maintained.

To state the case in a sentence: Japan, by diverting to the construction of cruisers and submarines no small part of the energy she formerly expended on capital ships, will soon be in possession of a fleet of "auxiliary combatant" vessels superior in some respects to that of any other power. The ratios of international strength formulated by the authors of the treaty have thus been upset, unless we assume the capital ship alone to possess any fighting value—an assumption manifestly absurd. Indeed, the

¹ Reprinted from the *Atlantic Monthly*, February, 1923, by permission.



NAVY TORPEDO PLANE MAKING PRACTICE FLIGHT AT SAN DIEGO, CAL.
The splash is that of a torpedo which has just been dropped.

relative importance of auxiliary craft has increased very considerably as the result of limiting the number of heavy ships. Therefore, when we find that Japan during the last five years has built or ordered no less than twenty-three light cruisers, as against a collective total of sixteen for Great Britain and the United States, it would be futile to pretend that the Washington agreement has either stabilized naval strength on anything like a comprehensive basis, or relieved the naval authorities of Britain and America of all anxiety as to the future.

So far is this from being the case that at the moment of writing the United States Navy Department is understood to have in preparation a large program of auxiliary construction; and it seems only a question of time before the British Government will be compelled to take similar measures.

Japan, to do her justice, has been perfectly frank with regard to her post-Conference naval policy. Her intentions have been advertised to the world, even if their full significance has not been unduly stressed. She justifies her formidable program of auxiliary tonnage on two grounds: first, that it is necessary in order to save the national shipbuilding and kindred industries from the ruin that would have overtaken them had all naval construction come to a standstill; secondly, that the additional cruisers and submarines are really needed to compensate for the reduced strength of the battle fleet.

As regards the first argument, it is no doubt true that the sudden stoppage of all shipbuilding for the navy would have been a most serious blow, not merely to the trades directly concerned, but to the whole economic system of the country.

A few facts and figures bearing on this point will not be out of place. Under the impetus of conditions set up by the World War, the industries of Japan flourished amazingly for a few years, and shipbuilding, in particular, was developed to a remarkable extent. In 1914 the number of yards producing sea-going ships did not exceed six; by 1918 there were fifty-seven such establishments in operation. The slump of 1920 drove more than half these newer yards out of business, and in August of last year only twenty-six remained.

At the close of the war, when orders for mercantile tonnage began to fall off and at length almost entirely ceased to come in,

the shipyards were forced to depend for their existence largely on Admiralty contracts. From their point of view the big naval program of 1920 was a veritable godsend. Irrespective of smaller vessels, it provided for the construction, within eight years, of a fleet of sixteen capital ships, with an average displacement of approximately 42,000 tons, and of this number at least one-half were to have been built in private yards. Under the Washington agreement no less than fourteen of these vessels were cancelled, including six that were already building. When this decision became known in Japan, there was an outcry from the shipbuilders, who saw themselves faced with ruin, and even louder protests came from the shipyard workers, who form one of the best-organized branches of Japanese labor.

According to official statistics, there were in Japan nine large private yards that were generally engaged in warship construction, employing between them 96,000 hands, and four naval dockyards, employing some 61,000 hands. Consequently, the number of workers who were interested in the building of warships was 157,000, of whom, it was estimated, fifty per cent would be thrown out of employment through the cancelling of battleship orders alone. Had auxiliary ships been included in the limitation scheme, the percentage of men rendered workless would have been as high as seventy-five.

Even as it was, organized labor became dangerously restive. Mass meetings of shipyard employees were held, and violent speeches made against the Government for having "betrayed" the workers. Agitators who had previously complained most bitterly of the burden of armaments were now foremost in opposing a reduction of that burden.

It has been hinted in some quarters that this popular clamor against the suspension of warship construction was by no means distasteful to the Government, who saw in it an excellent excuse for continuing the development of the navy on as large a scale as was possible without transgressing the letter of the treaty. Be that as it may, generous concessions were granted with a promptitude that was rather surprising, in view of the tendency of officialdom in Japan to resist any form of dictation by the masses.

Less than a month after the Washington Conference dispersed, it was announced at Tokyo that an agreement had been come to between the Government and the shipbuilders, whereby the latter would be provided with other work in lieu of the countermanded battleships, and the wholesale discharge of shipyard workers would thus be avoided. The scheme was to retain practically intact that part of the 1920 program which related to auxiliary ships, and to advance the dates of laying down these vessels. For example, contracts for cruisers which it had originally been intended to begin in 1923, 1924, and 1925 respectively were to be antedated twelve months, so that the normal building programs of 1922, 1923, and 1924 would in each case be increased to that extent. In other words, twice as many auxiliary ships were to be laid down each year as the original program had legislated for. This plan embraced destroyers, submarines, and supply ships, in addition to cruisers.

In allotting the new contracts, special regard was had to the claims of the shipyards which would have benefited most under the pre-Conference battleship program, orders for new light cruisers going to those state and private yards which had been promised, or were already at work upon battleships and battle cruisers. The largest cruisers will therefore be constructed at the Imperial dockyards of Kure and Yokosuka, and the private establishments of Kawasaki and Mitsubishi, and smaller units of this type by the Sasebo arsenal and Uruga Dock Company. At the same time contracts for destroyers, submarines, and fleet-supply ships are being distributed among the yards named and also among other establishments which suffered through the recision of the pre-Conference program. Furthermore, extra work has been provided for the state dockyards by assigning them the dismantling of condemned ships.

By these measures the crisis in the shipbuilding industry has been largely overcome, all the principal yards throughout the country have a fair amount of work in hand, and it has been necessary to discharge only a comparatively small number of workers.

On the other hand, the cost of all this auxiliary tonnage will be heavy enough to wipe out a great part of the sum saved by scrapping the capital-ship program, and the net saving effected in

new naval construction will consequently be much less than the taxpayers had anticipated. There are not wanting those in Japan who censure the Government for adopting this policy of "robbing Peter to pay Paul." It would, they contend, have been better to encourage the shipyards to develop other branches of activity than naval construction, such as the manufacture of locomotives and other railroad and street-car material, iron and steelwork parts for bridges and structures, industrial power plants, automobiles, and the like, as has been done by European armament firms since the war.

As it is, the critics declare, the wealth of the nation is being dissipated on fighting ships which apparently have been ordered simply to keep the shipyards in operation, and not because they are absolutely essential for defense purposes.

Another and still graver objection urged against the Government's policy is that this sudden expansion of the auxiliary combatant fleet may evoke suspicion abroad as to Japan's bona fides in respect to disarmament, and lead other powers to strengthen their fleets in the same way, thus ushering in a new era of naval rivalry and mutual distrust. That these apprehensions are well-founded has already been made clear by the reported action of the American naval authorities in drawing up a new program to counterbalance Japan's growing strength in cruising ships and submarines.

Figures showing the actual reduction that has been effected in Japan's naval expenditure by the limitation scheme are not yet available, but the gross amount appears to be in the neighborhood of 100,000,000 yen.

In 1920, the navy budget amounted to 320,000,000 yen, or nearly twice as much as it had been three years previously; and subsequent additions, due to the passing of the "eight-eight" program, brought the gross amount to nearly 500,000,000 yen. In the following year, another big increase was made, and, but for the limitation scheme, naval expenditure during the current year would have been not far short of 750,000,000 yen.

According to Tokyo press reports, the naval estimates submitted in July last provided for an ordinary expenditure of 120,000,000 yen and for an extraordinary outlay of 198,000,000 yen, showing decreases of 15,000,000 and 60,000,000 yen re-

spectively. On October 30, it was announced that the Finance Department had further reduced the navy estimates in the forthcoming budget by 30,000,000 yen, making a total reduction of over 100,000,000 yen, or approximately one-seventh of the amount that would have been spent on fleet armament this year had the "eight-eight" program remained in force.

This saving is accounted for almost entirely by the deletion of the capital ships and the abandonment of new docks and harbor works; only a very small percentage is due to reductions in personnel; and, as we have seen, the bill for auxiliary construction, so far from showing any cut, has been greatly increased. Some money will also be saved by giving up Port Arthur as a naval station and reducing the status of the Maizuru base.

As no precise figures of the cost of man-of-war construction are published in Japan, the expenditure that will be incurred by virtually doubling the auxiliary building program over a term of several years can be only roughly estimated. It is known, however, that the light cruisers of the *Kuma* class, 5,500 tons, have cost nearly five million dollars each; that the 7,500-ton ships of the *Yubari* class are priced at about seven and a half million dollars, and the new 10,000-ton ships, four in number, at not less than ten million dollars each. First-class destroyers, of which many are building and twenty-four projected, probably cost one and a half million dollars per boat; the medium submarines (900 tons) about the same; and the new large type (1,500 tons) three million dollars.

These prices are, if anything, underestimated, the cost of naval construction being abnormally high in Japan, despite the relative cheapness of labor. In any case, it is sufficiently obvious that a program which embraces not less than fifteen cruisers, ranging from 5,500 to 10,000 tons, forty destroyers, and fifty submarines, besides a great many supply and dépôt ships, will eventually cost an enormous sum of money.

II

It is patent to everyone that Japan is at present building more combatant tonnage than any other power; but what is not so generally appreciated is the fact that she is actually building more tonnage of this description than all the other powers combined.

Once more it must be emphasized that the so-called "Disarmament Treaty," while certainly bringing dreadnaught construction almost to a halt, has not only done nothing to limit the building of other man-of-war types, but has actually increased the number of these vessels in the case of Japan, and in all likelihood will eventually produce a corresponding expansion of the auxiliary ships of other navies.

It would occupy too much space to narrate in detail the various strategical reasons which the Japanese naval authorities have put forward, through the medium of the press, to justify the building of so many "auxiliary combatant ships"; but their arguments may be summarized as follows. The battle fleet has been so reduced under the limitation agreement that it will no longer be capable of fulfilling its proper function,—namely, going out to seek and engage an enemy fleet on the high seas,—but must henceforth be kept in reserve as a last card, only to be played if and when the enemy's preponderance has been reduced or destroyed by tactics of attrition. Therefore, to compensate for the loss of direct offensive power formerly vested in the battle fleet, Japan requires for her safety an unusually strong force of minor weapons of attack. She particularly needs an ample supply of swift ocean-keeping cruisers, to guard her own communications and harass those of an enemy, and also to prey upon his commerce, with the ulterior purpose of diverting part of his strength from the immediate war-zone.

For the same reasons, it is essential to have a large fleet of ocean-going submarines, which could be used alternatively for coast defense, for near and distant mine-laying expeditions, and for raiding commerce. The twofold problem confronting the Japanese Navy in war would be to maintain, as far as possible, the freedom of the ocean trade routes, and above all to guard communications with the Asiatic Continent, which would represent a vital and indispensable source of supply for foodstuffs and raw materials. In the absence of a really effective battle fleet,—effective, that is, in the sense of being able to engage the battle fleet of any potential enemy with reasonable prospects of success,—these strategic tasks can best be performed by cruisers and submarines.

As regards the loss of power resulting from the limitation of the battle fleet to ten ships, this, it is argued, is far more serious than might be inferred from superficial observation. Four of the ships are battle cruisers of a design which post-war progress has made obsolete, and which could not be placed in the line of battle without exposing them to grave risk of summary destruction. This brings the battle fleet proper down to six ships, none of which could possibly be replaced if lost or disabled.

Japan is, therefore, at a grave disadvantage as compared with Britain and the United States, since their infinitely greater resources would enable either of those powers to build new capital ships very rapidly in place of any that were lost in action.

Another important factor in the revised scheme of defense is the chain of outlying naval bases with which Japan has girdled herself during the past few years; and, apropos of this subject, there can be no harm now in disclosing certain facts of which the American public has, perhaps, hitherto remained in ignorance.

In the fall of 1920, the Japanese naval authorities, in co-operation with the General Staff, worked out a scheme for fortifying the principal islands that guard the approach to the coasts of Japan proper. This measure was intended to counteract the then impending development of Cavite and Guam as first-class bases for the American Pacific fleet.

In September, 1920, a committee of experts, headed by Captain Mori, of the Navy Department, visited all the islands in question, reporting that the points where strong fortifications and naval facilities were needed most urgently were the Bonin Islands, Amami-Oshima, and Yajima in the Loochoo group. This report having been approved by the Government, steps were immediately taken to carry the proposals into effect, and the work of fortification was put in hand early in 1921.

For reasons of finance it was intended to spread the appropriations over two, if not three, years, as in view of the slow progress being made with the American works at Cavite and Guam it was thought that the completion of the Japanese insular bases might safely be prolonged till the end of 1922. But in the spring of last year (1921), it became known at Tokyo that the United States Government was meditating an appeal to the powers to join in a conference for the reduction of naval armaments, and this news

decided the Japanese authorities to speed up the completion of their island forts, with the object of putting themselves in a favorable position strategically before the conference was summoned.

Consequently, from May 1921, the work at the Bonins went on with feverish energy. A large fleet of steamers was chartered to convey thither the thousands of laborers and the vast quantities of material needed to complete the task. So great was the demand for cement, that a temporary shortage of this material ensued. Throughout the summer and autumn, building operations went on night and day, and during this period the Bonin Islands were under a military administration which maintained a strict surveillance over visiting foreign ships. The Japanese press was also forbidden to publish any mention of what was in progress at the islands.

By December, the last of the batteries had been constructed and armed with heavy long-range guns, the barracks, munitions dépôts, aerodrome, and radio station had been constructed, and every navigable approach had been rendered impregnable.

Meanwhile the Washington Conference had assembled, and Admiral Baron Kato, of the Japanese delegation, had taken the first opportunity to inform his American colleagues that Japan regarded the abandonment of the Philippine and Guam fortifications as the condition precedent to negotiations for the reduction of her shipbuilding program. If the United States would agree to this, Japan, on her part, was prepared to suspend her own plans of fortifying her Pacific islands, and would at the same time co-operate most willingly in any practicable scheme for limiting her floating armaments.

Baron Kato did not add, however, that Japan, having been secretly engaged in fortifying her island bases for many months previously, had just completed the work, whereas scarcely any progress had been made in the development of the American stations at Cavite and Guam.

III

Whether the American naval experts were cognizant of the facts is a moot point, but it seems scarcely credible that they would have acquiesced in the status quo proposal for Pacific bases, had

they known that Japan was already in possession of a thoroughly equipped naval station at the Bonins. If they did know this, one is forced to conclude that their protests against the renunciation of the right to put the Western Islands in an adequate state of defense were overruled by the Washington Cabinet on political grounds.

In any case, Japan scored a signal triumph in securing the adoption of the status quo agreement with regard to Pacific fortifications. From her point of view, it was a strategical gain of the first magnitude, which more than compensated for the reduction of her battle fleet.

That the full significance of the clause has come to be appreciated by American naval students is clear from certain outspoken criticisms which have appeared recently. The Japanese Foreign Office, betraying a sense of humor for which few would have given it credit, issued the following communiqué on February 22 last:

"The Treaty on the limitation of naval armaments signed at Washington on February 6, 1922, comes into force upon its ratification by all contracting powers. With regard, however, to certain fortifications and naval bases of the British Empire, the United States, and Japan, in the region of the Pacific Ocean, it is provided in Article XIX of the Treaty that the status quo at the time of its signature shall be maintained. In conformity with the spirit of this provision, the Japanese Government have decided forthwith to discontinue the work on the fortifications in the Bonin Islands and Amami-Oshima, and further to maintain the existing condition of fortifications and naval bases in Formosa and the Pescadores. The necessary measures for giving effect to this decision have already been taken."

Napoleon's dictum that "war is an affair of positions" applies to the sea no less than to the land, and to a far greater degree than was the case a century ago. A fleet in those days was largely self-supporting, and could remain at sea for months at a time, independent of bases, because it had no fuel problem to contend with. But the conditions today are vastly different. The "reach" of a modern battle fleet can be measured with almost mathematical precision, governed as it is by the number and situation of the *points d'appui* available. In time of war, no fleet dare venture

to cruise for long in waters where ample facilities for refueling do not exist. If the ships of which it is composed have an average fuel-endurance of, say, 10,000 miles, that does not mean that they would be able to advance to a point 5,000 miles from home and still be sure of getting back in safety. For the maximum cruising-radius of a ship is always reckoned in terms of economical speed, and bears no relation to the distance that could be steamed if the engines were running at full power. Thus, a battleship able to cover 10,000 miles at a constant speed of 12 knots might be unable to travel more than 3,000 miles at her full speed of 21 knots—and in war-zone operations high-speed steaming is the rule rather than the exception. To cruise under a small head of steam in waters where enemy submarines might be encountered would be to risk destruction.

Now the only insular base in the Pacific where the American battle fleet could be sure of finding adequate supplies of fuel is Hawaii, and we are therefore justified in assuming that 2,000 miles represents the utmost distance to which the fleet could venture to the west or south of Hawaii in time of war; and even this would leave a dangerously narrow margin of fuel for emergencies. But if America fights in the Pacific at all, she will fight for definite objects, among which will be the protection, or—what is far more likely—the recovery, of the Philippines, and to gain these objects she must be prepared to undertake active naval operations in the immediate zone of war, namely, the Far Western Pacific.

How this is to be done without local base facilities is a problem which apparently defies solution. It is certain that in their present defenseless condition, now to be stereotyped by the treaty, both the Philippines and Guam would become Japanese in the first weeks of war.

This is fully realized and freely admitted by American strategists; but it is interesting, nevertheless, to have Japanese testimony on the point. In the *Dai Nihon*, of August 1921, a thoughtful monthly review published at Tokyo, the editor, Mr. Seijiro Kawashima, discussed the probable course of hostilities between his country and the United States, and affirmed that, should the outbreak of war find the main American naval force at Panama, San Francisco, or even at Hawaii, "it will be open for Japan to take the Philippines, indeed Guam. . . . Should the worst

happen, therefore, Japan would risk everything to destroy these two bases, and the ferocity with which she will fight may well be imagined." Clearly, therefore, the islands in question must be ruled out of any objective examination of the task that would confront the United States Navy in a war with Japan.

IV

It remains, then, to consider how far offensive operations in the Western Pacific would be feasible without bases. From Hawaii to the nearest Japanese coast is some 3,400 miles, making 6,800 miles for the round voyage, which would be well within the cruising capacity of modern battleships *at economical speed*.

But, as was emphasized above, ships steaming at low speed in an area frequented by hostile submarines would be in continual danger of attack. To be reasonably safe from submarines, they must not only steam at a high rate of speed, but make frequent alterations of course—a method of progression which involves an abnormally heavy consumption of fuel in traversing a given distance.

It is, therefore, extremely doubtful whether the fuel-endurance of the ships would suffice even for the outward journey of 3,400 miles; and if the fleet found itself close to the enemy's coast with empty bunkers, and no friendly base at hand, it would be exposed to certain annihilation.

Consequently, on the surface of things, it looks as if the American Navy would be physically incapable of undertaking major war-operations in the Western area of the Pacific; there is no visible means whereby the fatal handicap of nonexistent bases might be overcome. It is as if the United States, in pledging itself not to proceed with the fortification of its distant islands, had voluntarily surrendered, not merely the power to defend these possessions, but the power to defend its interests in the Far East generally, no matter how vital they are or may become in the future.

Japan, on the other hand, has gained a strategical predominance in her adjacent waters far exceeding that which she could ever have hoped to achieve had the competition in naval armaments pursued its normal course. For good or ill, the doors of the

Far East have been slammed, barred, and bolted, and the keys placed in Japanese keeping.

The British Empire, it is true, might be in a position to dispute this supremacy, thanks to its actual and potential base-resources in the Pacific; but here again the factor of distance would come into play on the side of Japan, by making sustained offensive operations against her coast next to impossible, even for a greatly superior British fleet pivoted on Singapore, New Guinea, or Australian harbors.

If these premises are sound they seem to warrant the conclusion that a naval war between the United States and Japan would speedily result in a stalemate, affording no opportunity for a decision by direct action from either side, since the opposing battle fleets would be unlikely to come within several thousand miles of each other. It is here, however, that the significance of the large program of minor naval construction, upon which Japan is now engaged, may be manifest.

Since history contains no record of a war having been decided wholly, or even mainly, by the destruction of maritime trade, the greatest authorities have always excluded the *guerre de course* from the domain of grand strategy, relegating it to a subsidiary place in the general scheme of belligerent operations at sea. Nevertheless, there was one period of the World War when it seemed as if science had placed in Germany's hands the means of undermining what had come to be regarded as a fundamental principle of naval strategy. The submarine campaign came very near to breaking the resistance of the Allies, and did, in fact, produce that anomalous situation in which the power supreme at sea, whose warships held undisputed command of the ocean surface in nearly every part of the world, nevertheless found its marine communications menaced to a highly dangerous degree, and was able only by superhuman exertions to maintain the minimum amount of sea-borne traffic essential to the further conduct of the war.

At an earlier stage of the struggle, grave loss was caused to shipping by the few German cruisers which were at large when the war began. It took a good many months to dispose of these surface corsairs, and the task was accomplished only by diverting a numerous force of swift cruisers from other war-service, and

sending them to scour every ocean area where the raiders were likely to be met with.

Comparatively large as was the fleet of cruising ships at the disposal of the Allies, it barely sufficed to meet this demand. Had fewer ships been available, the German commerce destroyers would have enjoyed a much longer lease of life, and the embarrassment they caused must have been infinitely more serious.

Among naval men a firm conviction obtains that the next great war will inevitably witness the revival of submarine attack on merchant shipping, since they believe that parchment safeguards against this practice will soon collapse under the stress of war. Assuming then that the naval methods in vogue during the World War are likely to reappear in the event of a Pacific campaign, the advantages which Japan would derive from her powerful fleet of cruisers and submarines are obvious. They would enable her, while maintaining her battle fleet intact behind its impregnable barrier of insular and coastal defenses, to wage ruthless war against her enemy's trade and communications.

When the current building program has been completed, she will possess at least twenty-five modern cruisers of great speed and wide radius of action, together with more than seventy submarines specially designed for prolonged voyaging, the majority of them being well able to cross and recross the Pacific Ocean without needing to replenish their fuel.

V

What resources has the United States Navy to deal with this immense fleet of potential commerce-destroyers? On the basis of recent war experience, it has been estimated that from four to six fast cruisers are required to circumvent the activities of one enemy surface raider; while some idea of the tremendous array of force necessary to cope with submarine attack on merchant shipping is conveyed by the fact that upward of 3,000 patrol craft of every type were kept in service by Great Britain alone, though the Germans never had more than thirty U-boats at sea simultaneously.

At the present time, there are only ten modern cruisers built or building in the United States. Even if all these ships were released from duty with the fleet, in order to protect trade routes,

what could they hope to achieve against twenty-five enemy raiders with speeds not inferior to their own?

The task would, of course, be hopeless from the start. Unless, therefore, the convoy system were adopted,—and this would be at once a difficult and a precarious business under the peculiar conditions governing warfare in the area we are considering—American merchant shipping would, in all probability, be swept from the Pacific very soon after the outbreak of hostilities with Japan.

While there is not the least reason to suppose that this blow would force the United States into submission, the combined loss of trade and prestige resulting therefrom would be a serious matter. Nor would it be possible to retaliate with any marked effect; for the same dearth of cruisers that rendered the United States powerless to protect its overseas trade would debar it from molesting the communications of the enemy.

Moreover, provided that her connections with the Asiatic mainland were secure, Japan could afford to dispense for a time with other external sources of supply, and practically the whole of her cruisers and submarines, having but little patrol duty, would be free to engage in offensive operations.

Thus, the widely held idea that a war in the Pacific must speedily end in a deadlock, in which neither opponent could inflict any appreciable damage on the other, is seen to be fallacious. It would have been sound enough had the naval limitation agreement embraced all types of fighting craft; but the failure of the Conference to extend the ratio system to cruiser and submarine tonnage has completely altered the situation.

In view of the foregoing considerations, it would cause no surprise to learn that American naval authorities entertain profound misgivings with regard to future developments in the Far East. That their responsibilities have been immeasurably increased by the Limitation Treaty is self-evident. Indeed, it might be affirmed without fear of contradiction that the treaty, by depriving the United States of all power to intervene by force of arms, has placed her interests in the Far East completely at the mercy of a foreign state, upon whose good-will they must henceforth depend. The task of defending them against aggres-

sion would have been difficult enough, had the naval limitation scheme never been conceived. As things are, their defense—by warlike action, at any rate—has to all appearances become impossible.

EDITOR'S NOTE: Other interesting articles by Mr. Hector C. Bywater will be found on pages 873 and 879 of current issue.

WHAT THE UNITED STATES NAVY COSTS AND WHO PAYS FOR IT

Its Deficiencies and the Cost of Remedying Them

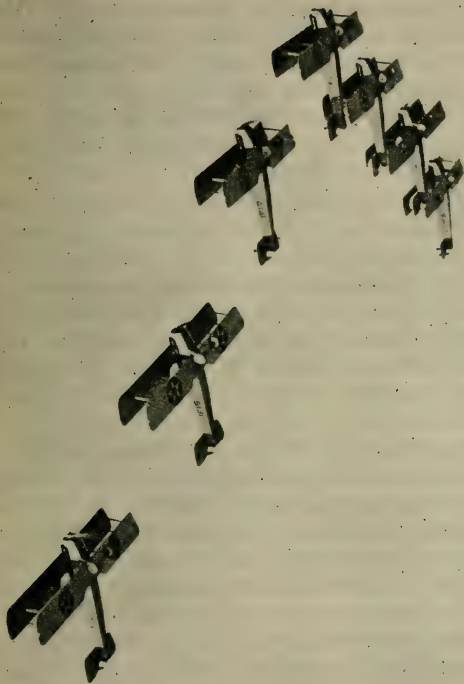
BY WILLIAM HOWARD GARDINER

Vice-president, Navy League

The accompanying map and tabulations show that most of the inland and southern states seem to look on the Navy differently than do almost all the coastal states and some few inland states. Such a difference in point of view now in the United States has an historical precedent in the England of some three hundred years ago—a point of view that has changed there in a way that should be of interest to all of us now in the United States.

Three hundred years ago there were only about 5,000,000 people living in the 51,000 square miles that are England proper—which is 5,000 square miles smaller than the single state of Illinois, in which over 6,500,000 people now live. And though there were only about 100 people per square mile in Jacobean England, the lack of work and extreme poverty of the masses led many to believe that the country then was overcrowded.

At that time the people of the inland counties of England objected extremely to contributing anything to the support of the British Navy; for they believed that its only use was to defend the coastal counties from invasion and that the inland counties were secure behind the protection of the coastal counties. In this they were about as nearly right as are some people in our inland states today. For without good roads, without railroads and without airplanes, it then would have been about as difficult for an invading force to penetrate to the heart of Jacobean England as it now would be for an invading force to reach Missouri from the Gulf of Mexico—which every strategist knows is the way really to invade the United States, avoiding the difficult transportation over the Allegheny or Rocky Mountains.



NAVY OBSERVATION PLANE SQUADRON IN FLIGHT AT SAN DIEGO, CAL.

ENGLAND LEARNS THE LESSON

When England's overseas trade began to expand rapidly—over two hundred years ago—and when it relieved the poverty of the overcrowded masses in the inland agricultural counties by giving them work in industries making exports, then the inhabitants of the inland counties of England came to realize that they were vitally interested in the British Navy because it not only protected the coastal counties from invasion, but it also opened up and protected markets for the growing overseas trade in products that originated in the inland counties.

On page 179 of his book, *Democratic Ideals and Reality*, a present-day member of the British Parliament, Mr. Mackinder, gives recent instances of this when he says: "Britain was fighting for her South American markets when her fleet maintained the Monroe Doctrine against Germany in the Manila incident (where it helped Dewey), and for her Indian market when her fleet kept Germany at bay during the South African War, and for the open door to her China market when her fleet supported Japan in the Russian War."

Though the British fleet did not fire a single shot in any one of these instances, it has been such naval defenses of overseas trade and markets that have proved the British Navy to be one of the essential elements in the system whereby England has developed her inland production so that, *in the same area* where 5,000,000 were overcrowded three hundred years ago, now seven times as many people are supported—and the inhabitants of the inland counties support the British Navy as heartily as do those of the coastal counties because their trade and livelihood depend on it.

HOME AND OVERSEAS TRADE

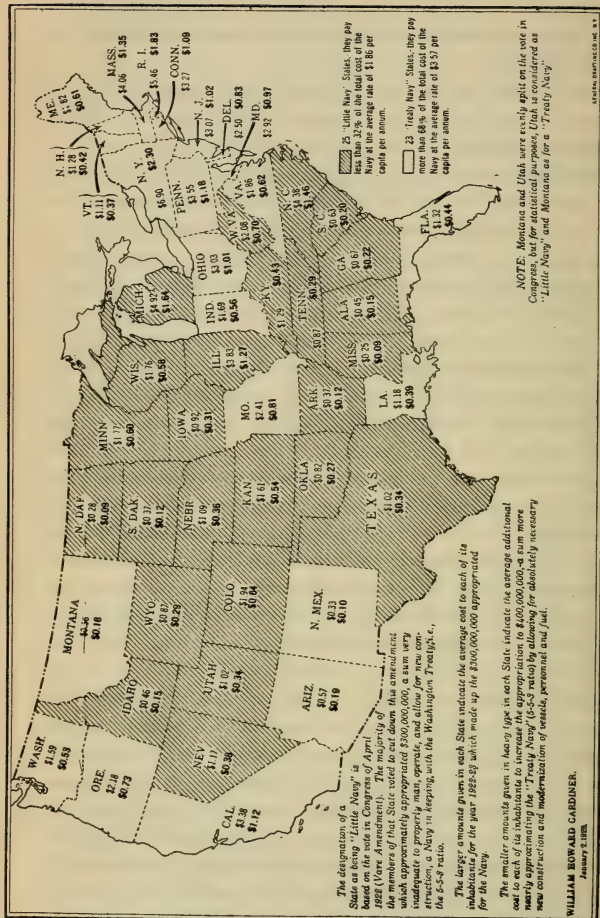
While different parts of a country may prosper merely by interchanging products, it stands to reason that a business, a community or a nation cannot prosper as much by supplying only its own wants as it could if it supplied its own wants and also sold its surplus production to others in exchange for materials *and* for the ownership of overseas property—as England has been doing to her great profit for centuries.

The maximum net profit from production, whether it be farming or manufacturing, comes from the sales of the surplus production over and above that required to meet home needs or operating expenses.

This was shown by the high wages and great prosperity in the fiscal year 1920 when our exports amounted to about \$8,109,000,000; and the subsequent drop of our exports to about \$3,771,000,000 is responsible to a great extent for the drop in the price of agricultural and other products and the hard times out of which we are emerging as our overseas export trade is picking up.

In the main the great bulk of the products of the United States come from the shaded area in the accompanying map. The surplus production of some, such as cotton and food stuffs, is exported directly when there is an overseas market for them. The surplus production of others, such as minerals, is exported indirectly or after manufacture into steel shapes, harvesters, automobiles, electrical machinery, etc.—again, when there is an overseas market for such products. But whether it be raw materials or manufactured products, the overseas demand—that is, markets—determines the volume of surplus products that can be sold profitably. And the volume of profitable sales of surplus products, most of which originate inland, to a great extent determines whether or not the year is profitable to the miner, to the farmer, and to the mechanic and manufacturer. The low level to which low exports dragged business during the last two years has shown us how all suffer when exports shrink.

Though England's experience during the last three centuries has proved that the defense and development of overseas markets and trade is vitally important to the inland producing regions as well as to the coastal trading ports, and though her experience has proved that an adequate Navy is essential to the defense and development of overseas markets and trade, the accompanying map and tabulations show that most Congressmen from our inland and southern states today look upon our Navy about as the inland counties of England looked upon the British Navy three hundred years ago.



Map showing the States the majority of whose representatives in Congress voted for or against the "Treasury Navy." Also showing the present cost per capita per annum to the inhabitants of each State of the present \$300,000,000 Navy, and the additional cost per capita per annum to the inhabitants of each State of an increase in the naval appropriation to \$400,000,000 in order to bring the Navy up more closely in accord with the Treaty ratio of 5-5-3.

THE RESULTS OF THE ARMS CONFERENCE

The shaded states in the map are those the majority of whose Representatives in Congress voted specifically to reduce our Navy away below the treaty ratio agreed on at the Washington Conference for the Limitation of Armaments. As far as the size of our Navy is concerned, all that resulted from the Conference was that we were to scrap seventeen old capital ships and stop building thirteen of the fifteen new capital ships under construction; but we were authorized to build five new aircraft carriers. No limitations were put on the number of cruisers, destroyers, submarines or other auxiliaries we or any other power might build.

At the close of the Conference our Navy was somewhat undermanned, though it had over 100,000 enlisted men, though on fifteen of the old ships to be scrapped there were in all less than 1,000 men, and though no crews had been provided for the new capital ships, for the new aircraft carriers, for ten new cruisers and other unlimited auxiliaries we were building. Furthermore, the evidence before Congress was that the British Navy would continue to have over 100,000 men and the Japanese over 70,000. Under these circumstances the 5-5-3 ratio called for about 120,000 men in our Navy. But the "Little Navy" group in Congress, under the lead of Patrick H. Kelley of Michigan (since defeated), insisted on authorizing only 67,000 men—which would have reduced us actually below Japan instead of maintaining the 5-3 ratio. Secretary Hughes entered a plea for the effective maintenance of equality with Great Britain and five-thirds the strength of Japan, and President Harding said that 86,000 men was the minimum our Navy could get along with for the time being.

REDUCING OUR NAVY

The Vare Amendment—which was carried—raised the 67,000 men advocated by Congressman Kelly to 86,000, but not to the 120,000 then called for by the treaty ratio.

As this vote was the largest recently recorded expression of opinion in Congress, it has been taken as the latest basis of classification as between those states the majority of whose Representatives favor a "Little Navy," irrespective of the naval treaty ratio of 5-5-3, and those states where opinion is more strongly

TABLE I
SUMMARY OF CONTRIBUTION TO THE NAVY
FROM
TWENTY-FIVE "LITTLE NAVY" STATES AND FROM TWENTY-THREE "TREATY NAVY" STATES

	Population 1 July, 1922 (estimated)	Total Federal Taxes from States in 1922	Per Cent of Federal Rev- enue contrib- uted by Each Group of States in 1922	Group of States	Annual Contribution of Each Group of States to a \$300,000,000 Navy (See Note (a))		Annual Contribution of Each Group of States to a \$400,000,000 Navy (See Note (b))		Increased Cost per Capita per Annum
					Amount	Per Capita	Amount	Per Capita	
					E	F	G	H	
1	51,489,825	\$1,009,885,055	31.92	25 "Little Navy" States	\$ 95,760,000	\$1.86	\$127,680,000	\$2.48	\$0.62
2	57,277,304	2,153,464,669	68.08	23 "Treaty-Navy" States	204,240,000	3.57	272,320,000	4.75	1.18
3	108,827,129	\$3,163,349,724	100.00%		\$300,000,000	\$2.76*	\$400,000,000	\$3.68*	\$0.92*

* True Average (a) Approximate appropriation for present Navy (b) Appropriation absolutely necessary to more nearly approximate the Treaty Navy (5-5-3 Ratio) January 2, 1923

in favor of our having actually a "Treaty Navy." To supplement this classification—which is geographically shown on the accompanying map—there is shown also the per capita cost, based on the latest figures on the Federal Revenues from the Treasury Department and the latest estimates as to the population of each state from the Bureau of the Census. From these the accompanying tabulations have also been compiled.

WHO PAYS FOR THE NAVY

Table I shows that the twenty-five "Little Navy" States with nearly 51,500,000 inhabitants, furnish less than 32 per cent of the money to support the Navy—and they furnish it at the average rate for all of them of only \$1.86 per capita per annum. That is what the total so-called "crushing burden of naval armament" amounts to in our "Little Navy" States—\$1.86 per inhabitant per year!

Table I also shows that the twenty-three "Treaty Navy" States, with over 57,000,000 inhabitants, furnish over 68 per cent of the money to support the Navy—and they do this at the average rate of \$3.57 per capita per annum, while the cost of the Navy to the whole country averages only \$2.76 per capita per annum, or less than three-quarters of a cent per head per day! That is the economic strain, "the crushing burden" (sic) our Navy imposes on us today—less than three-quarters of a cent.

WHO PROFITS BY THE NAVY

When we recall that most of our exports originate in our interior and southern states—in our "Little Navy" states—and that history has shown that an adequate Navy is essential for the development of overseas markets and export trade, it is interesting to note that the states in which undoubtedly over two-thirds of our exports originate are paying less than one-third of the cost of the Navy which renders our "Little Navy" states over twice the commercial service it renders the "Treaty Navy" states which pay over two-thirds of its cost. In other words, for every dollar the "Little Navy" states spend on the Navy they get four times the commercial service that the "Treaty Navy" states do. And yet it is the "Little Navy" states that are objecting to the desires of the "Treaty Navy" states for what all our authorities who labored through the Washington Conference agree is the minimum

TABLE II
CONTRIBUTIONS OF THE TWENTY-FIVE "LITTLE NAVY" STATES TO THE NAVY

	Population 1 July 1922 (estimated)	Total Federal Taxes in 1922	Per Cent of Feder- al Rev- enue con- tributed by each State in 1922	State	Annual Contribution of Each State to a \$300,000,000 Navy (See Note (a).)		Annual Contribution of Each State to a \$400,000,000 Navy (See Note (b).)		Increas- ed Cost per Cap- ita per Annum
					Amount	Per Capita	Amount	Per Capita	
					E	F	G	H	
1	2,402,273	\$11,464,181	0.36	Ala.	\$1,080,000	\$0.45	\$1,440,000	\$0.60	\$0.15
2	1,797,987	6,979,045	0.22	Ark.	660,000	0.37	880,000	0.49	0.12
3	975,837	19,956,651	0.63	Cal.	1,890,000	1.94	2,520,000	2.58	0.64
4	2,969,664	20,988,707	0.66	Ga.	1,980,000	0.67	2,640,000	0.89	0.22
5	459,233	2,111,891	0.07	Idaho	210,000	0.46	280,000	0.61	0.15
6	6,703,312	270,332,568	8.55	Ill.	25,650,000	3.83	34,200,000	5.10	1.27
7	2,450,180	23,658,789	0.75	Iowa	2,250,000	0.92	3,000,000	1.23	0.31
8	1,789,423	30,379,622	0.96	Kan.	2,880,000	1.61	3,840,000	2.15	0.54
9	2,449,263	33,122,196	1.05	Ky.	3,150,000	1.29	4,200,000	1.72	0.43
10	3,889,418	201,874,185	6.38	Mich.	19,140,000	4.92	25,520,000	6.56	1.64
11	2,467,318	46,253,943	1.46	Minn.	4,380,000	1.77	5,840,000	2.37	0.60
12	1,790,618	4,640,498	0.15	Miss.	450,000	0.25	600,000	0.34	0.09
13	1,323,193	15,251,391	0.48	Nebr.	1,440,000	1.09	1,920,000	1.45	0.36
14	77,407	837,546	0.03	Nev.	90,000	1.17	120,000	1.55	0.38
15	2,649,982	122,413,329	3.87	N. C.	11,610,000	4.38	15,480,000	5.84	1.46
16	644,850	1,011,739	0.06	N. D.	180,000	0.28	240,000	0.37	0.09
17	2,123,851	18,402,453	0.58	Okla.	1,740,000	0.82	2,320,000	1.09	0.27
18	1,727,070	11,447,385	0.36	S. C.	1,080,000	0.63	1,440,000	0.83	0.20
19	650,108	2,565,444	0.08	S. D.	240,000	0.37	320,000	0.49	0.12
20	2,377,308	21,794,677	0.69	Tenn.	2,070,000	0.87	2,760,000	1.16	0.29
21	4,860,658	52,347,676	1.66	Texas	4,980,000	1.02	6,640,000	1.36	0.34
22	468,979	5,130,487	0.16	Utah	480,000	1.02	640,000	1.36	0.34
23	1,526,169	33,452,438	1.06	W. Va.	3,180,000	2.08	4,240,000	2.78	0.70
24	2,708,858	50,488,606	1.59	Wis.	4,770,000	1.76	6,360,000	2.34	0.58
25	206,875	2,079,558	0.06	Wyo.	180,000	0.87	240,000	1.16	0.29
26	51,549,825	\$1,009,885,055	31.92%		\$95,760,000	\$1.86*	\$127,680,000	\$2.48*	\$0.62*

* True Average (a) Approximate appropriation for present Navy (b) Appropriation absolutely necessary to more nearly approximate the Treaty Navy (5-5-3 Ratio)

January 2, 1923

Navy "necessary to our defense and to our prestige"—the "Treaty Navy" in all respects.

Tables II and III show the details, state by state, for the "Little Navy" group of states and for the "Treaty Navy" group of states, which are summarized in Table I. It is interesting to note not only that the "Treaty Navy" states pay over two-thirds of the total Federal Taxes and of the cost of the Navy, but that the seven coastal states of California, Connecticut, Maryland, Massachusetts, New Jersey, New York and Pennsylvania together pay 51.25 per cent of the total Federal Taxes and of the total cost of the Navy.

A glance at the cost of the Navy to some of the states whose Representatives seem averse to maintaining the "Treaty Navy" is interesting. Column F in Table II shows that Alabama pays forty-five cents per capita per annum for the Navy, Arkansas thirty-seven cents, Georgia sixty-seven cents, Idaho forty-six cents, Mississippi twenty-five cents, North Dakota twenty-eight cents, South Carolina sixty-three cents and South Dakota thirty-seven cents per capita per annum. But such industrial "Little Navy" states as Illinois and Michigan, with their harvesters and automobiles (for export) bring the average of this group up to \$1.86 per capita per annum as their contribution to their Navy.

THE OFFICIAL NAVAL POLICY

Up to this point we have considered the costs of the Navy only as it is. Let us pass on to its requirements and to their costs.

In his Annual Report, Secretary Denby set up certain basic naval policies:

"To create, maintain and operate a Navy second to none in conformity with the ratios for capital ships established by the treaty for the limitation of naval armaments.

"To make the capital ship ratio the basis of building effort in all classes of fighting ships.

"To maintain an active personnel afloat in conformity with the ratios for capital ships established by the treaty for the limitation of naval armaments."

THE NAVY'S DEFICIENCIES

Secretary Denby's Annual Report then states specifically that inadequate allowance of personnel and of fuel have resulted in

TABLE III
CONTRIBUTIONS OF THE TWENTY-THREE "TREATY NAVY" STATES TO THE NAVY

	Population 1 July 1922 (estimated)	Total Federal Taxes in 1922	Per Cent of Feder- al Rev- enue con- tributed by each Group of States in 1922	State	Annual Contribution of Each State to a \$300,000,000 Navy (See Note (a).)		Annual Contribution of Each State to a \$400,000,000 Navy (See Note (b).)		Increas- ed Cost per Cap- ita per Annum
					Amount	Per Capita	Amount	Per Capita	
					E	F	G	H	
1	367,589	\$ 2,141,235	0.07	Aria.	\$ 210,000	\$0.57	\$ 280,000	\$0.76	\$0.19
2	3,697,070	191,682,856	4.16	Cal.	12,480,000	3.38	16,640,000	4.50	1.12
3	1,449,097	50,224,046	1.38	Conn.	4,740,000	3.27	6,320,000	4.36	1.09
4	228,330	5,889,266	0.19	Del.	370,000	2.50	760,000	3.53	0.83
5	1,024,054	14,319,857	0.45	Fla.	1,350,000	1.52	1,800,000	1.76	0.44
6	2,989,493	53,032,400	1.68	Ind.	5,040,000	1.69	6,720,000	2.25	0.56
7	1,836,108	22,753,958	0.72	La.	2,160,000	1.18	2,880,000	1.57	0.39
8	774,617	14,804,208	0.47	Me.	1,410,000	1.82	1,880,000	2.43	0.61
9	1,489,399	45,971,937	1.45	Md.	4,350,000	2.92	5,800,000	3.89	0.97
10	3,977,490	169,813,494	5.38	Mass.	16,140,000	4.06	21,520,000	5.41	1.35
11	3,432,566	87,456,488	2.76	Mo.	8,280,000	2.41	11,040,000	3.22	0.81
12	593,396	3,432,162	0.11	Mont.	330,000	0.56	440,000	0.74	0.18
13	446,304	5,909,999	0.19	N. H.	570,000	1.28	760,000	1.70	0.42
14	3,315,231	107,149,339	3.39	N. J.	10,170,000	3.07	13,560,000	4.09	1.02
15	368,861	1,280,701	0.04	N. Mex.	120,000	0.33	160,000	0.43	0.10
16	10,712,680	779,772,777	24.65	N. Y.	73,950,000	6.90	98,600,000	9.20	2.30
17	6,014,914	192,301,680	6.08	Ohio	18,240,000	3.03	24,320,000	4.04	1.01
18	811,875	18,792,189	0.59	Ore.	1,770,000	2.18	2,360,000	2.91	0.73
19	8,991,666	336,708,043	10.64	Penn.	31,920,000	3.55	42,560,000	4.73	1.18
20	620,308	35,743,707	1.13	R. I.	3,390,000	5.46	4,520,000	7.29	1.83
21	352,428	4,157,296	0.13	Vt.	390,000	1.11	520,000	1.48	0.37
22	2,372,940	46,595,649	1.47	Va.	4,410,000	1.86	5,880,000	2.48	0.62
23	1,411,890	23,610,782	0.75	Wash.	2,250,000	1.59	3,000,000	2.12	0.53
24									
25									
26	57,277,304	\$2,153,464,669	68.08%		\$204,240,000	\$3.57*	\$272,320,000	\$4.75*	\$1.18*

*True Average (a) Approximate appropriation for present Navy (b) Appropriation absolutely necessary to more nearly approximate the Treaty Navy (5-5-3 Ratio) January 2, 1923

the deterioration of vessels, in inadequate training of the fleet and in a lowering of its gunnery exercises. He also says:

"I feel it my duty to report to you that in certain types, such as fast cruisers, aircraft carriers, seagoing submarines and aircraft, the Navy is deficient."

In this connection it must be remembered:

(1) The *enlisted personnel* incident to the British Navy is over 100,000 and that of the Japanese Navy is about 65,000. Consequently the 5-5-3 treaty ratio calls for an enlisted personnel of about 108,000 men in the United States Navy.

(2) The *modern cruisers* built and building in the British Navy number fifty-six and aggregate 296,390 tons while those in the Japanese Navy number twenty-five and aggregate 157,730 tons. The United States Navy has no completed cruiser less than twelve years old, but is building ten modern cruisers aggregating 75,000 tons. The 5-5-3 treaty ratio calls for us to build in addition to these, the equivalent of twenty-two ten-thousand-ton cruisers.

(3) In *seagoing submarines* the British Navy has fifteen built and two building while the Japanese have twenty-eight built, building or immediately projected. The United States has only three built and three building. Consequently, the 5-5-3 ratio calls for us to build forty more seagoing submarines for the United States Navy.

REQUIREMENTS AFLOAT

The following outline gives the total requirements—apart from aviation proper—that now seem necessary to round out and balance up our fleet and to make it adequately efficient under the 5-5-3 ratio. But it should be realized that changes in the British and Japanese programs may call for corresponding changes in the following estimates.

The equivalent of twenty-two ten-thousand-ton cruisers...	\$231,000,000
The equivalent of forty long radius seagoing submarines....	160,000,000
The equivalent of 69,000 tons of aircraft carriers (in addition to those now building).....	58,000,000
To modernize our battleships.....	30,000,000
To complete miscellaneous auxiliaries now building (supplemental to 1923-24 appropriation).....	35,000,000
<hr/>	
Total to round out and balance the fleet under the 5-5-3 ratio..	\$514,000,000

REQUIREMENTS ASHORE

It should be borne prominently in mind that a fleet of naval vessels is just as dependent on supply and operating bases as is the rolling stock of a railroad—it is even more dependent on them. At the present time our naval bases on the Atlantic coast are slightly deficient; but our bases on the Pacific are wholly inadequate to support the fleet in the Pacific even in peace time. To the fleet figures above given should be added at least the following:

To modernize and develop naval supply and operating bases.. \$146,000,000

One of the very important and costly essentials in a naval base are adequate docking facilities. The efficiency of this work can be greatly enhanced by providing floating docks that can be moved as the movements of the fleet may require. About \$40,000,000 would provide what may prove to be approximately adequate facilities in this respect.

As a summary of building requirements we therefore have:

To round out and balance the fleet.....	\$514,000,000
To furnish approximately adequate bases and floating docks	186,000,000
<hr/>	
Total construction required to bring the Navy up to the 5-5-3 ratio	\$700,000,000

ANNUAL COSTS

A study of procedure in naval construction suggests that only about one-tenth of this total sum, or \$70,000,000, could be expended efficiently in the first year in which the construction to bring the Navy actually up to the 5-5-3 ratio is inaugurated.

It was shown above that the 5-5-3 ratio calls for an enlisted personnel in the United States Navy of about 108,000 men. But until construction now in hand is completed—about a year hence—it would seem that we might be able to do with a total of only about 96,000 men—to complete the complements of vessels now undermanned and to put in commission vessels to compensate, for instance, for those now being used in humanitarian work in the Near East

It also was stated above that restricted appropriations for supplies, etc., are impairing the training and gunnery of the fleet. It

would seem therefore that the following allowance should be made to improve the efficiency of the fleet now afloat pending its being rounded out:

Allowance for 10,000 men and their sustenance.....	\$10,000,000
Allowance for supplies incidental to increased training.....	20,000,000
	<hr/>
	\$30,000,000

To raise the efficiency of the present fleet and to begin construction of the vessels and bases necessary to bring it actually up to the 5-5-3 ratio in every respect, a fair estimate for the first year is as follows:

Additional personnel and fleet operation	\$30,000,000
Additional fleet construction	51,400,000
Additional base facilities	18,600,000
	<hr/>
	\$100,000,000

TAXES IN THE UNITED STATES

Though this sum looks large as, say, an increment to taxes, it would mean only an increase of about one per cent in the total sum of nearly *ten billion dollars* which we spent for government in 1922—as appears from the following table:

TABLE IV APPROXIMATE TOTAL TAXATION IN THE U. S.

	Purposes	Amounts	Averages per Capita for 1922
	A	B	C
1	Municipal and Town	\$4,151,000,000	\$38.08
2	County	1,285,000,000	11.79
3	State	1,285,000,000	11.79
4	Navy (Federal)	300,000,000	2.76
5	Other Federal Purposes	2,863,000,000	26.27
6	Present Totals	\$9,884,000,000	\$90.68
7	Additional Cost of a \$400,000,000 Navy	100,000,000	0.92
8	TOTALS	\$9,984,000,000	\$91.60

Line 7, Column C, of the above table shows that this move to maintain the naval treaty ratio would cost an average of ninety-two cents per capita per annum for the whole country—out of a total cost of \$91.60 per capita per annum for our government.

Reference to Line 1, Column I of Table I develops, however, the further fact that the increased costs to the "Little Navy" states, as a group, would be only *sixty-two cents* per capita per annum. And if we glance down Column I of Table II, we see just what would be the increment cost per capita per annum for each of the "Little Navy" states. For instance, for Arkansas, twelve cents per capita per annum, for Idaho, fifteen cents, for Mississippi and North Dakota, nine cents, and for South Dakota, twelve cents.

In considering all of the costs cited in the accompanying tabulations it should be realized that Federal Taxes consist almost entirely of Income Taxes and Excess Profit Taxes, the great bulk of which are paid by individuals having comparatively large incomes in the cities and by the more profitable corporations. The result of this is that New York State alone paid almost a quarter of the total Federal Taxes in 1922, whereas agricultural states—and the agricultural population of the country as a whole—make a disproportionately small contribution to the Federal Taxes and to the cost of the Navy.

To bring it up toward the treaty ratio will cost an additional average for the whole country of about ninety-two cents per capita per annum. The "Treaty Navy" states, which pay over two-thirds of the cost of the Navy, would meet this increased cost at the average rate of \$1.18 per capita per annum. The question is: will the "Little Navy" states, which pay less than one-third of the cost of the Navy, continue to oppose the Navy's being brought up toward the treaty ratio when they realize that to do this will cost them *only sixty-two cents* per capita per annum? Will they continue their opposition when they realize—as the inland counties of England began to realize over two hundred years ago—that an adequate Navy is essential to the protection and development of the foreign trade of the United States, a trade over two-thirds of which originates in our inland and southern states?

It should be realized that the current Naval Bill for 1924, as passed by the House of Representatives and by the Senate, makes virtually no provisions for bringing the Navy up materially nearer to the treaty ratio. It should be the hope and effort of every American that adequate supplemental measures to this effect will be passed by the present Congress.

DISCUSSION

The Part of Engineering in Command

(SEE PAGE 203, FEBRUARY, 1923, PROCEEDINGS)

REAR ADMIRAL N. C. TWINING, U. S. NAVY.—It may, indeed, be true, as suggested by Admiral Wilson in his discussion of Admiral Robison's paper, that the author, in his enthusiasm for his subject, has not discriminated with nicety between engineering in general and marine engineering and that he has taken into the engineering family certain adopted children who have with it no blood relationship; but this association of what, after all, are really branches of the same science serves the useful purpose of broadening our view and saving us from the error of regarding naval engineering as including only what is usually connoted by the term "marine engineering," that is, the science of motive power afloat.

That the present-day naval officer of the line must be, to some extent, an engineer, both theoretical and practical, is a matter of common knowledge. That the value of engineering knowledge is not to the junior officer alone but to officers exercising command as well is the theme of Admiral Robison's paper, a theme which he has very ably and convincingly developed; if he has included the broad field of naval engineering in his survey he has stressed the importance of the narrower field of marine engineering.

We are now far from the days when the captain reprimanded his chief engineer for not having taken on board a spare vacuum while fitting out at the navy yard and the executive officer thought that nothing smaller than the sailing launch could serve to transport a five-ton jack but we have still, perhaps, to become fully alive to the fact that engineering knowledge is no less essential to the equipment of an officer for command than is a knowledge of strategy, tactics, and leadership.

It is true that not all men have equal liking for engineering nor equal capacity for becoming proficient in it but the same inequality exists respecting other branches of the naval profession. To some naval officers "engine room duty" is distasteful; others dislike watch standing and drilling; not all can be expected to like or become expert in everything involved in the exercise of their profession but all can be made to realize the importance of acquiring a thorough working knowledge of all the practical branches, including engineering, and the necessity of such knowledge as a part of the mental equipment of a successful naval officer.

As Admiral Robison points out, the naval officers who fought the *Constitution* were masters of knowledge of the motive power at their command; had their knowledge been confined to the fact that the braces swung the yards their practical skill in handling their vessel would not have been great but would have been on a par with that of an officer of

today whose knowledge of his motive power is confined to the manipulation of the engine telegraph.

Whether or not the amalgamation of 1899 has proved beneficial to the navy in a material way is a question that is still argued pro and con; Admiral Robison, who is certainly in a position to know whereof he speaks, thinks that "the efficiency of the navy is now suffering from a fallacious idea on the part of some younger officers, that engineering duty can be neglected without interfering with their development for high command"; obviously relief from this condition must be sought by awakening all officers, both the younger and the older, to the fallaciousness of the idea. The argument against the amalgamation will lose all point and application when the service shall have become thoroughly alive to the fact that engineering is a branch of the naval profession that is no less certainly within the line officer's province than command.

Admiral Wilson refers to the impression that has unquestionably existed in the service at large that "too much engineering duty" has, in some instances, operated to prevent an officer's selection for promotion; certainly no officer has failed of selection by reason of his record for engineering duty unless, by taking "too much" of it he has had "too little" duty in the other lines necessary to his development. In such case it is difficult to see how the Selection Board could do otherwise than pass him over; with the acceptance of the truth that a knowledge of engineering is an essential part of an officer's equipment for command will come the correlative practice of passing over such officers as may have had an excess of other duty to the detriment of their development in engineering knowledge and experience.

The Part of Engineering in Command

(SEE PAGE 203, FEBRUARY, 1923, PROCEEDINGS)

DISCUSSION BY REAR ADMIRAL C. W. DYSON, U. S. NAVY.—I have read both the paper written by Admiral Robison and its discussion by Admiral Wilson with much interest.

As an engineer of long experience in the naval service I naturally sympathize most heartily with the majority of the statements made by the former. I am firmly of the opinion that no officer is really fitted for command unless he possesses sufficient knowledge concerning his ship and her "matériel" to enable him to check up by personal inspection the reports of his subordinates as to condition of the matériel under their charge.

Shining bright work and glistening new paint can cover up a multitude of sins and do cover them up in cases where the Senior Engineer Officer of a vessel is the military head only, and not the technical head of his department. The Commanding Officer of a vessel having such a Senior Engineer Officer is frequently deceived by appearances until his ship begins to fall off rapidly in efficiency. When this condition is arrived at, he

is then further deceived, unwittingly it is true, by his non-technical assistant who floods him with reports criticizing the design of the different items of equipment which are troubling him, and recommending that they be condemned and replaced by new machinery of later development. Finally the ship becomes a "lame duck" and is sent to a Navy Yard where she may spend months in the doctor's hands, and all of this due to a lack of appreciation of the old saw "a stitch in time saves nine," which in these cases could be changed to read "saves nine hundred ninety-nine."

A Commanding Officer with engineering experience can readily detect the difference between decreased efficiency due to fair wear and tear and that due to neglect, either due to inexperience or to carelessness, and can promptly take measures to correct the latter. If his responsible assistant is nothing more than the commissioned means of communication between the non-commissioned personnel of the department under his charge and the Commanding Officer, and the technical knowledge of the latter is insufficient to check up the reports made to him, there is little hope for the command remaining an efficient one for any great length of time.

The officer personnel is loyal to the core, both to the service and to their superior officers, but loyalty does not make up for experience and experience can be obtained only by close personal contact with the matériel. Experience teaches us what must be done to guard against trouble and what to do to correct troubles when they occur. It also teaches us our limitations as to self-support and points out to us the proper lines to follow in the search for improvement.

There is a great tendency in the service to confuse the terms "engineer" and "engine driver." An engine driver can be trained in a few months; it takes many months to train an operating engineer while it takes years to train a designer. An engine driver, pure and simple, bears about the same relation to an operating engineer that a driver does to a horseman. A driver will get the last atom of speed out of his horse even though the latter drops dead at the end of the race. A horseman will obtain the last atom of speed that can be safely obtained without ruining the animal he is handling. Apropos to this, I have a case in mind where a young officer was ordered to duty as Senior Engineer of one of our vessels and some time after assuming this duty the vessel was taken for a full speed trial. Shortly after the run had been held the Senior Engineer received a letter of commendation from the C-in-C based on the fact that the vessel had exceeded her original trial speed. Shortly after, the vessel was ordered to a dockyard where she was under repairs for weeks making good the damage which had been done during this commendable (?) trial.

Ignorance of engineering knowledge on the part of commanding officers sometimes leads to rather funny situations, as for instance: At one time in my service I took part in a long cruise of the fleet during which after running for several days at 10 knots speed the speed was increased to 12 knots and again, later, to 13 knots. One vessel in the fleet was burn-

ing 28 tons of coal at low speed; at 12 knots she reported burning 30 tons while at 13 knots her reported consumption was about 33 tons. Upon arrival at our destination all of the commanding officers of the fleet were summoned on board the Flagship. Upon the return of my Captain I asked him what they thought of the run. He replied that nobody could talk of anything but the wonderful showing of the——— and do nothing but congratulate her Captain. He was well worthy of congratulations for his ship had performed a miracle as is readily seen when you consider that the horsepowers for different speeds vary approximately as the cubes of the speeds, and that the fuel varies nearly as the horsepowers. The———had driven at 12 and 13 knots for very nearly the same power she required for 10 knots. Marvelous vessel! All you had to do was to wish a speed and you got it with no increase in cost.

I have been acquainted with, and have been shipmates with, very many splendid officers of command rank during my long service, but the majority of them were like a fine man with a wooden leg. He would have been a finer man with both legs. These splendid officers would have been still better ones if they had had the leg of engineering knowledge in addition to that of deck knowledge.

Some of our officers who entered the service in the days when canvas was supreme as a motive power and steam propulsion was no more than an auxiliary have, I am afraid, never gotten rid of the crick in their necks which they contracted from watching the weather leech of the top-gallant sail, and have been unable to look down and realize the revolution which has taken place beneath their feet.

While such officers have been unable to lower their eyes below the edge of the horizon, the hulls under their feet have changed from the 3,800-ton wooden hull of the *Trenton*, carrying a small three thousand horsepower engine and making 14 knots speed, to the 31,000-ton hull of the *Maryland* with 30,000 horsepower on her shafts and 21 knots, up to the *Saratoga* and *Lexington* of 35,000 tons, 180,000 horsepower and 34 knots speed.

Everything on the new ship is done by machinery. Even machinery is called in to assist you in taking a bath. The ship has become an immense machinery establishment of which the heart is the boiler installation. Let the heart fail and the establishment dies. This establishment being one in which victory is manufactured, it stands to reason that that officer who most thoroughly understands the component parts of the establishment over which he rules, and that assistant who has the best working knowledge of the portion of the establishment over which he has control, will produce the best results.

Admiral Wilson states "a successful fighting unit must be a fine example of teamwork." I agree with him but I would further add—and let each unit that enters into this team be given ample opportunity to familiarize

himself with his duties on the team in order that the team will function to the utmost efficiency during the crucial hour of trial.

The engineer department of a fighting ship is today as great a part of her fighting equipment as is her battery. It puts her into the fight, it keeps her in the fight, and if necessary it takes her out of the fight and renders her escape from an enemy of greater gun power possible. It has not been so long ago that speed was rated higher than armor as a protection. If this is a fact, what is speed but engine power, and what is engine power but the result of efficiency and training of the engineers?

The prejudices and opinions of men who go down to the sea in ships are proverbially strong and extremely hard to overcome. It required a period of sixty years from the first introduction of steam power into our navy until the last scrap of canvas for propulsive power was swept from our ships. Other strong prejudices have disappeared over night as the result of a sledge hammer blow. Thus, the old fetish of "wooden hulls and iron men" disappeared in the flame and smoke of the *Congress* and *Cumberland* while the guns of the ironclad *Merrimac* sounded requiem over its grave. Are we going to be allowed the long years necessary to bring to full growth the doctrine that such a living, vibrant creation of engineering skill as the modern fighting ship requires equal engineering skill on the part of those in whose hands its destiny lies in order that it may be maintained at a high degree of efficiency? Or must this doctrine be driven into us by the titan blows of terrible disaster, or by the bitter taste of shameful defeat?

An Administrative Flagship

(SEE PAGE 1299, AUGUST, 1922, PROCEEDINGS)

AND

A Fighting Leader for the Fleet

(SEE PAGE 561, APRIL, 1922, PROCEEDINGS)

REAR ADMIRAL N. C. TWINING, U. S. NAVY.—Each of these papers, while approaching the subject from a different angle and treating it in a different manner, has as its main theme the question whether the flagship of the commander-in-chief of a fleet should be a battleship (or other fighting ship of his command) or a separate, unattached vessel not intended or expected to "lie in the line" in battle. Each paper presents a thoughtful and logical argument and each, taken by itself, is a well-nigh convincing demonstration of the author's theorem; yet the conclusions reached in the two papers are diametrically opposed to each other.

It is convenient, for the purposes of a discussion of the two papers, to take up first the later one, that by Captain Taussig, which, as its title indicates, is a plea for a fast, commodious flagship for the commander-in-chief of a fleet; a flagship not attached to any tactical or task group; capable of housing the commander-in-chief and his staff and of transport-

ing them to any part of his command at his will without interrupting or interfering with the training of any one of the units or subdivisions of the fleet.

The writer presents a number of very cogent reasons for having such a flagship which may be summarized as follows:

1. The commander-in-chief of a large fleet the elements of which may be widely scattered must, for administrative purposes, be free to go wherever and whenever he pleases; the separate flagship becomes a fleet G. H. Q. entirely independent tactically and administratively of any subdivisions of the fleet and gives the commander-in-chief this freedom.

2. For the commander-in-chief's flagship to be attached to one of the subdivisions of the fleet:

- (a) is not conducive to the proper administration of the fleet as a whole;

- (b) does not permit the commander-in-chief wide enough latitude in conducting a strategic campaign;

- (c) may be of considerable embarrassment to him in a fleet action;

- (d) narrows his viewpoint.

3. No battleship or other fighting ship has sufficient space for properly housing the commander-in-chief and his staff.

4. A battleship flagship would either tie the commander-in-chief to the battleships or would remove one battleship from association and training with the others.

5. Facilities are made available for the installation of a much more complete and effective communication system (particularly as to radio) than would be possible in a battleship.

6. Training of officer personnel by means of tactical games and chart maneuvers is facilitated.

It will be observed that, with two exceptions, all these reasons bear mainly on the administrative features of the exercise of command; the reasons, while not all of equal weight, are sound and one cannot escape the conclusion that, for most effective administration of his fleet, the commander-in-chief should have the mobility afforded by a separate, unattached flagship. The questions of his proper position and function in battle are, however, practically untouched and are open to further consideration.

In setting down the reasons for service opposition to the administrative flagship Captain Taussig gives chief place to these:

1. Conservative opposition to innovations.

2. Tradition that a naval commander must always be in the front line.

3. Administrative ship is not a fighting unit.

4. Economic and political.

These reasons are pretty effectually disposed of with the exception of the second but it is in this one that the crux of the whole matter lies and

it is the one which leads to the different conclusions reached by Captain Taussig and Lieutenant-Commander Turner.

Captain Taussig very properly points out that not all traditions are good and that improvement has always come by discriminating between the good and the bad and casting aside the bad; he says, "here we have the tradition that a naval commander must always be in the front line" and seems to imply that, not only is this a bad tradition and should, therefore, be cast aside, but that in any case it has little bearing on the question of the administrative flagship; he states that those who argue against the administrative flagship on account of the front line tradition have tactical considerations in mind whereas the value of such a ship is determined by considerations of preparation, training, administration, and "the long strategic campaign" preceding a fleet battle.

What, then, is the commander-in-chief to do when the period of preparation and training, complexities of administration, the "long strategic campaign" culminate in battle? In what ship is he to be embarked? To what extent is he to exercise tactical command? These questions are not specifically considered by Captain Taussig and would seem, from the statement referred to in the preceding paragraph, to have been considered of secondary importance. But can we admit that the question of command in battle is of secondary importance? Is it not, on the contrary, of the first importance and is not any organization that does not take it fully into account, in truth a peace organization? As Captain Taussig truly says, it is fundamentally wrong to have a peace organization and a war organization.

If Captain Taussig has touched but lightly on the matter of tactical command in battle it is evident that he has not failed to consider it; this is indicated by his discussion of "tradition" and by his development of assumed analogies between military and naval operations and the exercise of command in the two fields. For example, "It used to be the tradition for an army commander always to be in the front line, and always to lead his troops in battle. As armies grew larger, this tradition had to give way to more sensible practice. The commander of an army now takes a position from which he can best handle the situation, and this position is *not* in the front line. It is known as "general headquarters," and may be anywhere "*not too near* the fighting front"; and again (in discussion of "A Fighting Leader for the Fleet"), "It was not so very many years ago when the army followed the tradition of always having the commander-in-chief at the front, leading his troops into battle. When armies got too big for this they stopped that foolishness and put the leader where he could best control; which was not a place where he would likely be the first man killed."

Now, one is inclined to think that it is a good many years since the *commander-in-chief* of an army personally led his troops into battle and one may question whether, when such was the custom, the practice was

"foolishness" and whether the modern practice was adopted as being "more sensible." Indeed, one might contend that, conditions permitting, the proper place for a military commander is in personal command and leadership of his troops and that he has been relegated to a position "not too near the fighting front" by force of circumstances, such as the size of armies and the methods of warfare, rather than because of a perception of any "foolishness" in the ancient practice.

It is notorious that troops are better *led* than pushed or driven and there is a psychological value in the troops knowing that their commander is in the fight with them and not in a place of comparative safety in the rear. Just how far up in the hierarchy of command we are to find the dividing line between fighting with the troops and controlling from the rear it would be difficult to say and, in any case, it must vary with circumstances. No one, however, would advocate the commander-in-chief of an army fighting in the first line trenches or "going over the top" with the shock troops and this not only because he is too valuable a man to the organization to be "the first man killed" but because he could exercise no effective command from that position. His place is, unquestionably, that from which he can most effectively exercise command.

Aside from these points, however, which are relatively unimportant but bear on the question of the perfection of the analogy between armies and fleets, we must consider the conditions under which the army and naval commanders respectively exercise their commands. The army commander, well behind the lines, sees nothing himself but shapes all his actions on information received; his communications are good and he receives timely reports from all sectors of his front; it is true that, in these days of colossal armies and extended fronts, the commander has not the same facility of control of troops as in the days of small armies and localized contact with the enemy; nevertheless the duration of a battle over several days enables him to alter plans, change his dispositions, distribute reserves, re-inforce hard-pressed points, and thus to participate tactically in the battle.

The case of the naval commander-in-chief is hardly a parallel one; he has not by any means the same facility of communication and must depend, for his grasp of the situation, on his personal vision and that of his staff officers; forces move at high speed and situations develop rapidly; a battle can hardly continue for days as is the case on shore but may be decided in a few minutes of fighting and probably will be within a few hours after the first contact. The naval commander has no reserves, in the sense in which that term is applied to land forces; his auxiliary forces, destroyers, submarines, and aircraft, may be considered in a way as reserves and their attacks may be so timed as to have the same effect as that of reserve troops brought into action on shore but it is by no means certain that the commander-in-chief in a detached flagship and perhaps far distant from the main forces is the best judge of the moment when these auxiliary attacks should be made.

Thus the analogy between battles at sea and on shore is seen to be very incomplete and the fact that a military commander exercises tactical command from a general headquarters distant from the field of battle does not justify the assumption that naval command in battle should be exercised in a similar way. It is evident to any one familiar with the sea that the exercise of tactical command in battle over a large force of diversified character will be most difficult and that much more must be left to indoctrination and to the initiative of subordinate commanders than is necessarily the case on shore. The battleships being the backbone of the fleet the fleet is not defeated so long as the battleships survive as a fighting force; our efforts must be directed mainly against the enemy battleships; our offensive is delivered, not by battleships alone, but by all our forces co-operatively and co-ordinately. Who can better judge of the time and manner in which the attacks of the several auxiliary forces should be delivered than the commander who is in our battleship line and is at grips with the enemy battleships? Bearing in mind that personal vision must be almost entirely depended upon for information, that vision is restricted whether from a fighting battleship in the line or from an independent ship out of the line, and that here, as in so many military situations, "time is everything," is not the commander who is placed nearest to the decisive point the one to determine when and how to deliver the decisive blow?

Turning now to Lieutenant-Commander Turner's paper we find it to be, in the main, a plea for the traditions of the sea, ". . . the fighting leader commanding the fleet from a fighting ship and exercising a personal control whether of strategical operations or tactical movements in battle that has in the case of shore forces necessarily been delegated to subordinates by the general in command."

Captain Taussig has clearly shown that, for all except tactical purposes, the functions of the commander-in-chief are better exercised in a non-fighting ship; to that extent it is believed that Mr. Turner's thesis cannot be maintained, but when we approach battle and the tactical command it would seem that his contention is sound; tradition, in this respect, is not bad and should not be cast aside.

Mr. Turner's statement that the battleships are the fleet, if taken literally, can hardly be subscribed to as Captain Taussig very properly points out in his discussion of Mr. Turner's paper but, as has been said previously in this discussion, they are its backbone and as long as they are undefeated the fleet is undefeated; it is doubtless this fact that Mr. Turner had in mind in making his statement and, as already pointed out, it has a very important bearing on the question of tactical command in battle. Lieutenant-Commander Turner's argument, if regarded as an argument in favor of the commander of the battleships being in a battleship in the fighting line, is sound. If this seems like setting up a straw man to be knocked down it must be remembered that, even before fleets consisted of

anything but battleships with, perhaps, a few torpedo craft, there were many advocates of the plan of having the commander-in-chief outside the line and controlling the tactics of the battle from a separate ship. With battle ranges well inside ten thousand yards and torpedo range less than five thousand the proposal would seem to have had more merit than under existing conditions.

A noteworthy statement in Mr. Turner's paper is this: "Any device that takes from the commander-in-chief his power of using the battleship force with instant facility for gaining his ends is fundamentally wrong. He should indeed, be its immediate commander, and whatever organization is necessary to relieve the admiral of administrative details should never be allowed to separate him so far that he will cease to be the actual tactical commander of that force."

Mr. Turner further shows that the "Two Flagship" plan not only fails to meet this requirement but is inherently bad for other reasons. If the commander-in-chief is to have one flagship should it be one that is most effective for administrative purposes or one that will enable him most effectively to exercise command in battle? Can there be any doubt as to the correct answer to this question?

The suggestion has sometimes been made that the commander-in-chief command the fleet in battle from an airship; Commander H. D. Cooke has recently enlarged on this idea in his discussion of Commander Jackson's paper on "Employment and Tactics of Aircraft." Should such a plan, on thorough examination and trial, be found feasible it would seem to offer a very satisfactory solution of the problem of the commander-in-chief's position in battle, being free from many of the objections to the independent flagship and having the very great advantage of giving a greatly extended range of vision to the admiral. So long, however, as we are confined to the surface of the water in our search for the commander-in-chief's battle flagship it would seem that a battleship in the line is the inevitable end of our search. If that is the proper place for the commander-in-chief in battle it is the proper place for him at all times and the freedom needed by him for visiting all portions of his command must be gained by placing at his disposal a tender of suitable size and equipment.

In both the papers under consideration and in this discussion it has been assumed that the commander-in-chief of the fleet was to command the fleet in battle. Under our present fleet organization, however, we have a "battle fleet" comprising battleships, cruisers, destroyers, and aircraft; presumably fleet submarines, if existent, would also be included. This "battle fleet" has a commander-in-chief whose flagship is a battleship; if this officer is to command the battle fleet in action he is placed in accordance with the principle developed in this discussion. There is still above him a commander-in-chief of the United States Fleet who is also, at present, borne in a battleship; if he is to command the battle fleet in action our principle is still adhered to so that, for the present, at least, we have

the "fighting leader in a fighting ship" for which Lieutenant-Commander Turner contends.

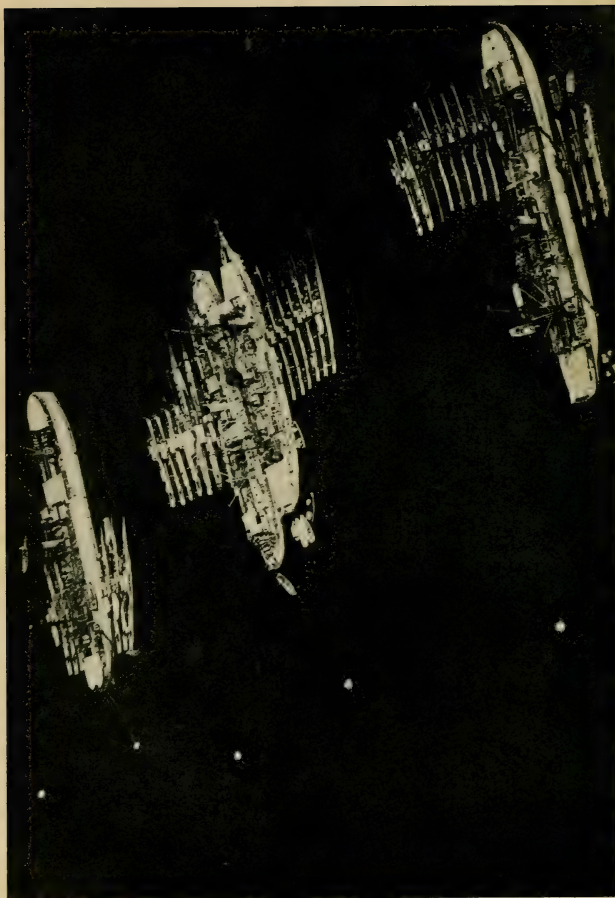
Life Insurance as Applied to the Naval Service

(SEE PAGE 2107, DECEMBER, 1922, PROCEEDINGS)

MAJOR K. F. ADAMSON, ORD. DEPT. U. S. ARMY.—In the December, 1922, issue of the U. S. Naval Institute PROCEEDINGS, an article on life insurance written by Edward L. Webb has been read with much interest, but as an officer of the army who is required to purchase life insurance and not sell it, I desire to take exception to a statement made on page 2112, in which the writer attempts to justify the rating up of naval officers as well as army officers by the insurance companies of this country.

Mr. Webb quotes figures as given in table 3 showing that the actual mortality to the expected was 68 per cent in the years 1917-21 inclusive, and compares this to the average of 95.8 per cent for the graduating classes of the U. S. Naval Academy from 1860-1916. This comparison is illogical and unfair in that the high mortality of fifty years ago was averaged in table 2 while it was disregarded in table 3. It is a recognized fact that the actual deaths to the expected has shown a constant reduction during the past fifty years, and if the author had used the life insurance data for civilian risks over the same length of time as that used for the graduating class at Annapolis, he would have found that there was not 27 per cent difference. The average of the last twenty-five classes at Annapolis gives practically the same percentage of actual mortality as that shown by table 3. While these are not directly comparable since table 3 shows the deaths for varying ages over a short period of time and the twenty-five-year average of table 2 gives information regarding approximately constant ages over a long period of time, still they should approach each other.

This letter is not written through any feeling of antagonism, as the article was well presented and is of the type that could be beneficial to all officers of the army and navy, yet it is felt that the propaganda of the insurance companies of America in rating up service risks is unwarranted and not justified by any statistics. In fact the writer recently had the pleasure of forcing a standard company to reduce his premium to that of a civilian policy holder after it had been rated up five years.



Official Photograph, U. S. Navy

SUBMARINE TENDERS AND SUBMARINES OF COMBINED FLEETS AT ANCHOR, BALBOA, C. Z.

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER F. W. ROCKWELL, U. S. NAVY

AND

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GREAT BRITAIN

BRITISH ADMIRALTY IS FIRM AGAINST FURTHER NAVY CUTS.—London, March 12.—The navy estimates for 1923-24 were presented in the House of Commons today by Lieutenant-Colonel Amery, First Lord of the Admiralty. The respective strengths of the British, American and Japanese navies were compared and the declaration of the Admiralty included an emphatic restatement on the maintenance of a one-power standard as the irreducible minimum below which it would be absolutely impossible for the British Empire to allow its naval strength to descend.

The First Lord believed the House would agree that even in a time of the most profound peace it would be impossible for Great Britain to be obviously and demonstrably inferior to any other power, however friendly. He maintained that with a view to preserving good understandings with America and Japan even the one-power standard had not been interpreted in any spirit of keen jealousy or competition.

The admiralty, he said, had undertaken a grave responsibility gratuitously in reducing to dangerous minimum before the Washington treaty had been ratified by all the signatories and he hoped that this earnest of Great Britain's good will would prove a determining factor in securing not only ratification but full and effective execution of the treaty by all concerned.

The First Lord pointed out that neither the United States nor Japan had reduced the personnel of their navies on such a large scale as Great Britain and that until Great Britain's two new battleships were completed

four years hence she would possess only one post-Jutland ship, the *Hood*, as against America's three and Japan's two, while of ships over 30,000 tons Great Britain would have only one as against America's ten and Japan's six.

Arguing that Britain's superiority in light cruisers was justifiable because of the extent of her empire, he asserted she was markedly inferior in destroyers and submarines. Alluding to the naval visit to Rio Janeiro as an unqualified success, he hoped the British Navy would regain touch with the prosperous and progressive nations of the South American Continent.

Colonel Amery also made reference to the creation of a naval base at Singapore, which he described as Britain's gateway to the Pacific and almost what the Panama Canal was to the United States. He insisted that the slow progress of this work was proof that there was no apprehension of difficulties in relations with Japan.

The gross estimates as laid down for the navy are £61,401,165, as compared with £69,476,657 for the previous year.

The British Army estimates for 1923-24, made public today, provide for £52,000,000, as against £62,300,000 for the previous year, a saving of more than £10,000,000.

The estimates include £28,132,000 for the maintenance of the standing army and provide for 170,800 men, excluding India, but including 10,500 Indian troops in the Middle East.—*Baltimore Sun*, 13 March, 1923.

IMPROVEMENTS AT PORT SAID.—Port Said is becoming more important as a coaling and oil distributing station. On the Asiatic side of the Suez Canal new docks are being built, and already ten firms of repute have their stations there. On the other side now stand a series of oil tanks at the disposal of the more modern shipping. One of the first operations following the recent decision to expend 100 million francs over the next ten years upon improvements, is to be to deepen the canal. It will then have a depth of 32 instead of 31 ft. at the end of the year, and as soon as possible will be increased to 35 ft. The banks, on the other hand, are to be 180 ft. instead of 135 ft. apart. The sea channel at the Port Said end of the canal will be deepened correspondingly, the work being more permanent by reason of the new breakwater being extended so as to prevent sand falling in from the north-east. At the Suez end, between Port Tewfik and the Red Sea, progress may not be so quick on account of difficulties with the Egyptian Government.—*Nauticus*, 3 March, 1923.

AIRSHIPS FOR THE NAVY.—That the Admiralty have long desired to restore airships to the Navy is well known. It was with the greatest reluctance that they consented in 1920 to the suspension of the service in deference to economy. These vessels were temporarily given up because the Air Minister declared that their retention would necessitate a considerable reduction in the provision of heavier-than-air craft, which the Admiralty rightly judged to be more indispensable to naval efficiency. In view, however, of the great importance which the Navy attaches to airships, it was obvious that means would eventually be found of restoring them to the service. This, it now appears, is to be done by means of the Burney scheme, details of which have been given in our columns from time to time. Briefly, the idea is to organize a commercial service of airships between Great Britain and outlying parts of the Empire. The ships will be designed and built under Admiralty supervision, thus embodying the characteristics necessary for war duty, though they will be normally employed for mercantile purposes. In consideration of their being held at the disposal of the Navy in an emergency, the Admiralty will pay a yearly subsidy of about £230,000. As this sum is rather less than the cost of one rigid airship of moderate dimensions, and as Commander Burney and

his associates propose to build a regular fleet of such vessels, all of the long-range type, which would be handed over to the Navy at the first threat of war, the money promises to be a sound investment from the national point of view. It is certainly a much cheaper way of obtaining an airship reserve than by leaving the Admiralty to build and maintain its own lighter-than-air craft. The Treasury, it is understood, is opposed to the arrangement in that it involves direct financial dealings by a Department of State with a commercial body, which is held to be undesirable, but little doubt is felt at Whitehall that this objection will be overruled by the Government considering the exceptional merits of the scheme from the standpoint of economy.

Whether the airship is really as safe and reliable a medium of long-distance transport as its champions declare it to be is still an open question, but the establishment of the projected service will determine this issue in the only practical way. If air liners are found to be carrying mails and passengers with reasonable safety and regularity between London and Bombay, their unique value for naval purposes will have been fully demonstrated. Up to now the case for the airship has rested more on promise than performance, and has been rather prejudiced by the extravagant claims of fervid partisans. For this reason the country would deprecate the expenditure of large sums of public money on the construction of airships before the type had been thoroughly tested, and hitherto there has been only one instance of such a vessel having successfully undertaken a long oversea flight.—*Naval and Military Record*, 7 February, 1923.

FUTURE OF THE SEA REGIMENT.—The amalgamation of the Royal Marine Artillery and the Royal Marine Light Infantry has been so often discussed during the last two decades that many will place no credence in the report that the fusion of the two branches of the sea regiment is now contemplated. It must be remembered, however, that amalgamation was considered by an official committee two years ago, and that, although it was then decided to take no action, statements issued at the conclusion of the deliberations left the impression that the decision was not final.

It is therefore not unlikely that the possibility of effecting economy by the amalgamation of the two branches is being seriously considered. The suggestion that such a change is probable is causing considerable anxiety among those who are opposed to alteration in the constitution of the corps, and fears are entertained, especially among old Royal Marine officers, that should amalgamation be effected it will be the first step to further drastic reductions and possible extinction in the near future.

The corps has on many occasions been described as the Cinderella of the service, and it is thought that those who are bent on cutting down the Navy votes hope to achieve their object by replacing Royal Marines by naval ratings in the gun-turrets of our warships. The doubt as to the fate of the Royal Marines will give added interest to the First Lord's statement when he introduces the navy estimates.—*Navy and Military Record*, 21 February, 1923.

GREAT BRITAIN'S NAVAL BASE AT SINGAPORE.—An interesting sidelight on British naval and commercial policy is given by a reference of the First Lord of the Admiralty in submitting the budget to Parliament, to the building of a naval base at Singapore. He described that place as Britain's gateway to the Pacific, and almost what the Panama Canal was to the United States. He insisted that the slow progress of this work was proof that there was no apprehension of trouble with Japan.

The international agreement reached at Washington respecting non-fortification of Pacific insular bases included Hong Kong, which had been the principal British stronghold in the Orient. To rectify this deficiency respecting protection of her huge commercial interests in China, Britain has merely to step back a short distance to Singapore, and there construct an adequate naval base of the first class.

The non-fortification restrictions of the Washington treaty hit America much harder. We, too, have large interests in the Orient, and they are likely to become of greatly increased importance with a normal expansion of our export trade. The Chinese market is the greatest free one in the world. The competition for that market will be an outstanding feature of trade development in this century. Britain, Japan, France, and other countries will be favored by strongly fortified points of support close to the area of trade competition. This is denied America. She can have no such outpost, notwithstanding her possession of islands so extensive, well located and populous as the Philippines.

Quite recently the Department of Commerce, in its official weekly publication, called attention to the need of establishing a commercial outpost in the Philippines if our merchants were to be placed on an equal competitive basis with foreign traders. The futility of establishing such a commercial outpost will be apparent to anyone understanding that economic competition is the most fruitful cause of war. Just so soon as our outpost became of sufficient commercial value seriously to affect the prosperity of our commercial competitors for the Chinese markets that outpost would be taken from us, for the simple reason that we could not defend it.

Naval strength and prosperity derived from overseas commerce go hand in hand. Centuries of human experience demonstrate this beyond a shadow of doubt. The British naval base at Singapore is equally a girder in Britain's commercial structure. That we are denied a corresponding commercial advantage is one of the many liabilities that must be charged up against our notable diplomatic defeat at the Washington Conference. —*Army and Navy Journal*, 17 March, 1923.

FRANCE

FRENCH NAVY NOTES.—Admiral Salaun (born in 1866), now the senior French flag officer, will this year relinquish command of the Mediterranean battle squadron, that will in July next reach its full battle strength, 24,000-ton *Bretagne*, *Provence*, *Lorraine*, with ten guns of 13.4-inch with post-war ammunition; 23,500-ton *Paris*, *Bart*, and *Courbet*, with twelve 12-inch weapons; three 27-knot cruisers, and a swarm of torpedo craft and seaplanes. This battle force has been modernized in every way, and has had the benefit of considerable sea practice during the last two years under a pushful and progressive leader, imbued with the spirit of action and a believer in the value of night tactics and of submarine and aerial weapons. Untiring effort has made it relatively to its size the most powerful force in existence.

From recent detailed explanations by Minister Raiberti in the Chamber, the loss of the battleship *France* does not point to inefficiency and neglect, but to over-confidence and bold training methods.

* * * * *

The Washington farce will, it is officially confirmed, be ratified by the unwilling Chambers at the express demand of President Poincaré, and without any public discussion, so as to avoid the risks of offending the susceptibilities of those who treated France unfairly. In sober and courteous language the right of France will be vindicated to keep the fleet

of her traditions and overseas responsibilities, all the more so as she has led the pace in the disarmament line with her discarding of her formidable Normandies' squadron, and is even prepared to totally suppress her war fleet if the virtuous protagonists of Panama Canal limitations are prepared to do likewise. It will be a purely academic affair, since battleships alone are limited, and France has no intention of constructing any. The elaborate and precise figures which the Paris Admiralty has supplied as to the cruisers and flotillas that are to be built within the next twenty years similarly have only paper value, and form at the most a basis for the ship-building efforts of the next few years. Program-making is a well-known *spécialité* of Rue Royale, but experience shows that the fate of every program is to be abandoned after a few years' spasmodic attempts. Moreover, the naval science is just now undergoing too many changes to enable our experts to see with any accuracy into the future.

The principal effort will be made in the air, and no wonder. The flying machine is an amphibious fighter, the twofold instrument of land and sea supremacy. So long as France is supreme in the air she will be secure against attacks from any comer. Recent experiments have called attention to the frightful character of wholesale destruction which war in the air will present in the next contest. Etampes tests, for instance, have shown the possibility of controlling aeroplanes from shore or ground stations, and thus of hurling a few tons of explosives and steel over hostile ships or towns at great distances. Technical researches and realistic experiments are taking place in French laboratories and aerodromes, at the same time as training is being kept brisk in all aviation centres. Under the energetic impulse of Admiral Lanxade, naval aviation is getting more and more alive, as demonstrated by compared statistics just published by Rue Royale. Defensive aerial squadrons flew 1,700 hours from July to December, 1922, while *écoles d'aviation* registered over 3,000 hours in the air. Considerable reinforcements are being prepared for the aerial formations of the Navy.

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The need of light cruisers is felt acutely in the service, especially since the Memel and Smyrna incidents, that called for a sudden reinforcement of French squadrons in distant waters. Obsolete 10,000-ton cruisers of the *Montcalm* class, on the point of being sold out of the service, have been hurriedly patched up for commissioning, and the 18,000-ton *Diderot* has hoisted anew the pennant for duties in the Channel; but it is felt that such deep-draught 17-knot ships represent to a great extent a waste of money and personnel at this stage, as they are little more than make-believe, vulnerable targets to bombs and torpedoes and essentially of the class the late Lord Fisher depicted as "able neither to run nor to fight." The splendid, unprecedented cruiser fleet of Great Britain is being universally admired as a perfect instrument of diplomacy, combining number, speed, and individual up-to-dateness and fighting power. Relatively to their size nothing better was ever made than the British *C* and *D* classes of light cruisers, at least for fleet duties and for service in European waters, for the reason that they carry the 6-inch caliber, that is the ideal weapon for action either against land fortifications or against hostile flotillas, together with a formidable torpedo armament.

The 8,000-ton and 35-knot *Duguay-Trouin*s, to be launched in a few months' time at Lorient and Brest, are certainly splendid units, in some respects the best cruisers yet designed, notably for speed and all-round defensive qualities. Yet they are being criticized as either too large or too small, too large to mount nothing heavier than 6-inch guns, and too small to comfortably carry the imposing ensemble of their paper qualities, and not large enough for independent work in distant oceans, while being

too heavy and too expensive for those police and flag-showing duties in European seas that require number as well as individual strength. Between the contretorpilleurs of 2,450 tons, just ordered, and ocean-going cruisers of 8,000 or 10,000 tons there is room for a medium-sized light cruiser of some 5,000 tons, to mount 6-inch weapons, whereas the largest light cruisers ought to have 7.5 or heavier guns. It is the opinion of many experts, especially among those who witnessed the tremendous waste of tonnage committed by ex-Chief Constructor Bertin in the *croiseur-corsaire* and *croiseur-cuirassé* series, that light cruisers ought to have the heaviest gun compatible with their displacements, and that the French Navy would act wisely in reviving in a modern form the 4,700-ton *Admiral Charner* type of light armored cruiser, that proved so tough in the Dardanelles.

The *sousmarins de grande patrouille* of the *Requin* class, of which four are building at Cherbourg, one at Brest, and the other at Toulon, will be powerful units of their class, and mark comprehensive progress over the *Fulton* class of pre-war design, considerably modified since. They will have a length of ninety meters, as against seventy-five, and a higher all-round standard of robustness with 200-ton extra-displacement, 1,100-1,400 tons (instead of 900-1,200). France experienced plenty of trouble with her submarine motors, but the hard work of researches and experimenting conducted since the war by various private firms, especially Le Creusot, have yielded results, and this time reliable and economical working under war conditions are confidently expected. With a view to leaving nothing to chance, the motors to be fitted are of low nominal power, are free from any innovation of an experimental nature, and are simply the reproduction with greater all-round robustness of well-studied and perfectly successful motors that have been in service for two years. Therefore more longevity is expected from these boats than was obtained in the case of the fragile and wasteful 500-ton *Laubeufs*, which were at first fitted with Diesels. There is no make-believe in them, no high speed (only 16 knots), no heavy armament, but substantial qualities for ocean offensive against heavily-armoured opponents: viz., habitability, seakeeping power (thirty-day cruising radius), and a good supply of 22-inch torpedoes, which eight tubes can be concentrated against a single target (four to six at a time).

The six coastal submarines of 600 tons of the 1921 program have only just been ordered, two at the Chantiers de la Loire, two at the Chantiers Normand at Havre, and two at Le Creusot (Chalon-sur-Saône). The Nantes-St. Nazaire yards are receiving submarine orders for the first time, which means a substantial addition to France's capabilities for submarine construction. The emulation between arsenals and private yards might be a source of higher constructional efficiency but for the unceasing meddling and unbusiness-like methods of Rue Royale *paperassiers* that paralyze alike state constructors and civilian *ingénieurs*.

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Although French opinion is dead against the battleship in any shape or form, the Admiralty has left the door open for battleship construction, and State constructors in their leisure time have already prepared various plans of 30,000 and 35,000-ton super-dreadnaughts at the same time as garde-côtes of 18,000 and 10,000 tons of both the surface and semi-submersible types, all *en théorie* to be insubmersibles. Researches, studies, and experiments are continuing, and for some time past there has been a tendency to reverse the early opinion that a 35,000-ton displacement is inadequate as a margin for the production of sufficiently powerful and reasonably safe capital ships. Artillery experts see the key to superior efficiency in the adoption of calibers under 16-inch, volume of fire being in their opinion and in the light of Jutland the deciding element of

superiority, especially against post-war ships that are bound to be lightly protected under thin armor, since nowadays targets at sea must be tortoise-like to be to some extent proof against shells, bombs, and torpedoes likely to come from every side and direction. For artillery duels—but they can be little more than passing incidents in sea contests—an up-to-date reproduction of the 1914 *Tourville* type (35,000 tons, complete steel carapace, with special bulges and caissons, 23 knots, sixteen 13.4-inch long caliber guns with new shells, twenty quick-firers with chemical projectiles, twelve anti-aerial weapons, etc.) would out-range and throw into obsolescence the mightiest mastodons now afloat, and notably the 16-inch American *Colorados*. From what has leaked out of long-range experiments at Gâvres and elsewhere, the ballistic science is now undergoing a process of evolution, and the destructive power of shells is wonderfully increasing, as is also the practical range at which actions can be fought. Well-trained, aerially-controlled long-range coastal batteries will tomorrow have a say in deciding encounters, as it is the way of all great naval battles to take place in proximity to the land.—J. B. Gautreau in *Naval and Military Record*, 14, 21, 28 February, and 7 March, 1923.

PARIS LIMITS FLEET TO TREATY TERMS.—Paris, March 8.—The Government's naval program was introduced in the Chamber of Deputies today by Minister of Marine Raiberti with the remark that the program "was conceived within the framework of the Washington accords, so that the Government cannot give stronger proof of its intention to obtain their ratification."

"The program," continued the Minister, "does not fix the number of units, as that may vary with the needs of the national defense, but it fixes the tonnage for each category.

"For battleships it provides for 175,000 tons, but the preamble explains that the Government has no intention of constructing to that extent at present, for these reasons:

"Firstly, the type of capital ship has not been settled upon; secondly, the fleet must be in accord with our financial means, and France has not the means to construct a fleet of capital ships and a fleet of light units.

"We must choose and we have chosen the latter.

"The fleet must be in keeping with France's policy, which is pacific, and therefore she needs a fleet assuring the defense of the coast and the protection of maritime communication. We need light cruisers, torpedo-boat destroyers and submarines. Only unforeseen circumstances will cause us to build battleships."

Deputy Locquin sought to establish that the United States Navy was beginning to increase the tonnage of its small units to bring them in proportion with the capital ships. Deputy Sevene, a naval captain, pointed out that it was France who demanded that the Washington agreements maintain freedom of construction as regarded the small units.

"We are not obliged to share your optimism," replied Deputy Locquin. "Furthermore, the Washington accords have not yet been ratified and nevertheless we are engaged in the direction of limitation of armaments."

The Minister of Marine reiterated that the Government intended that the treaty should be ratified.

Deputy Locquin said the slowness of the ratification process had furnished arguments for Americans in accusing France of imperialism.

"America's failure to ratify the peace treaty was also a great vexation for France," injected Deputy Balanant.

During the discussion it was stated that France would remain within the terms of the Washington accord in constructing a battleship of 25,000 tons to replace the battleship *France*.—*Philadelphia Public Ledger*, 9 March, 1923.

GERMANY

GERMAN ADMIRAL'S APOLOGIA.—The latest issue of the *Marine Rundschau*, Germany's official naval monthly, contains an important article by Admiral von Ingenohl, replying to the strictures passed upon his war leadership by the German staff history of the campaign at sea. He has been charged by the authors of that work with failing, on more than one occasion, to give adequate support to detached forces sent out on special missions, such as coastal bombardments and mine-laying expeditions, and with having interpreted too literally the Kaiser's notorious "order of operations," which virtually banned any form of fleet activity that entailed the risk of losing ships. Admiral von Ingenohl, it will be recalled, was commander-in-chief of the High Sea Fleet down to the beginning of February, 1915, when he was superseded in consequence of the Dogger Bank defeat of January 24.

We are bound to say that his apologia in the *Marine Rundschau* is not very convincing. The main fleet, he declares, had to be kept intact in deference to the express command of the "Supreme War Lord." At that early period of the war hopes of a speedy and decisive victory in France were still cherished at German G. H. Q., in spite of the reverse at the Marne. There was, consequently, no motive for risking the fleet, which was expected to be a useful pawn in the peace negotiations. Moreover, the Kaiser's resolve to avoid a general action at sea was fortified by the belief, based on dispatches from the German minister at Copenhagen, that Britain, in the event of a serious reduction of German naval strength, would compel Denmark to abandon her neutrality. "It was particularly with a view to this danger that the higher military command opposed any action at sea that was liable to involve the fleet in serious loss."

According to Admiral von Ingenohl, there was a further reason why the battle fleet did not always support ships that were sent to raid the English coast. If the fleet put to sea at all it would have to reckon with the chance of meeting the entire Grand Fleet, and it was therefore absolutely essential that it should include every effective fighting unit. Now, in the early months of the war the German main body consisted of only sixteen dreadnaughts (thirteen battleships and three battle cruisers), as against the British force of twenty-eight dreadnaughts. "But," writes the Admiral, "it was precisely at this time that our latest and most powerful ships; viz., the battle cruisers and the ships of the Third Squadron, were so frequently in need of urgent repairs to their boilers and machinery that it was a question of conducting light offensive operations without the support of the main body, or not at all."

This admission as to the frequent machinery breakdowns in the High Sea Fleet is significant. It confirms what Ingenohl's successor, Admiral von Pohl, wrote in his diary during 1915, that "this (the High Sea Fleet) is a queer sort of family. There is always something wrong, now with one and now with the other of them." On July 17, 1915, von Pohl wrote: "Now four ships all at once have failed, owing to engine defects. Among them is my own ship, *Friedrich der Grosse*." On July 19 he put to sea and had got as far as the Eider lightship when a number of ships developed engine trouble and he had to turn back. Admiral von Ingenohl himself now says: "Here and there in the staff history reference is made to repairs carried out on the dreadnaughts, but a tabular statement of all the normal and emergency repair work done on our ships, especially the dreadnaughts, during the first half-year of the war would be very useful, giving as it would the first complete picture of the readiness of the fleet for sea or battle at this period." It is evident from the testimony of Admirals Ingenohl and Pohl that the High Sea Fleet was less efficient as to material than German propagandists have endeavored to prove.

The impression conveyed by Admiral von Ingenohl's articles as, indeed, by the German staff history itself, is that neither the Kaiser nor any of his advisers had the faintest conception of what sea power really meant. They had been so absorbed in the work of building up a great fleet that they omitted to study the first principles of naval strategy. The "order of operations" issued at the beginning of the struggle, forbidding any movement likely to jeopardize important ships, was in itself a veritable recipe for defeat.

Whether the naval commanders, if left with a free hand, would have adopted a more vigorous policy is a question that will probably always remain open. It is certain, at any rate, that Admiral von Ingenohl strictly observed the Kaiser's "safety first" order both in letter and spirit. The same might be said of his successor, Admiral von Pohl. At no time throughout the war did the High Sea Fleet deliberately court a general action, even the Jutland encounter being inadvertent on the German side. And the same timorous policy was pursued by the German forces on the Flanders coast, as readers of Admiral Bacon's book, *The Dover Patrol*, will appreciate. It is, therefore, not surprising to find even German historians admitting that their navy failed to come up to expectations when subjected to the acid test of war.—*Naval and Military Record*, 21 February, 1923.

JAPAN

REORGANIZATION OF NAVAL FORCES.—The reorganization of the Japanese naval forces to conform with the reduction of material consequent upon The Washington Treaty has involved the abolition of the Third Fleet. The commissioned formations now stand as follows:

First Fleet: First Battle Squadron, *Mutsu*, *Hiuga*, *Ise*, *Nagato*; First Light Cruiser Squadron, *Kuma*, *Tama*, *Ohi*; First Destroyer Squadron, *Tatsuta* and four flotillas; First Submarine Flotilla; First Air Fighting Squadron.

Second Fleet: Second Battle Squadron, *Kongo*, *Hiyei*, *Kirishima*; Second Light Cruiser Squadron, *Kinu*, *Yura*, *Nagara*; Second Destroyer Squadron, *Kitakami* and four flotillas; Second Submarine Flotilla; Second Air Fighting Squadron.

Only seven of the ten capital ships which Japan retains in her post-treaty fleet are to be kept in full commission. The battleships *Fuso* and *Yamashiro* and the battle cruiser *Haruna* are apparently in reserve or manned with reduced crews.—*Naval and Military Record*, 21 February, 1923.

TYPES OF TORPEDOES.—The following are details of the type of torpedo now used in the Japanese Navy:

Total length with war head.....	6.70 meters
Do. do., practice head.....	6.86 meters
Length of war head	1.37 meters
Pressure	126.6 kg/cm ² .
Explosive charge	270 kilos
Range at 22 knots	18,290 meters
Range at 45 knots	4,023 meters
Heater	{ Water, 43 liters Fuel, 7 liters
Maximum depth	
Caliber	6.70 meters
	533 m.m.

For the use of torpedo-planes there is a special torpedo of 457 mm., with a range of 4,000 meters at 29 knots, and of 2,500 meters at 41 knots. Both the above torpedoes are of the Whitehead model. Other types,

however, have been developed in Japan, where marked interest has always been taken in this weapon. The Japanese Navy was the first to experiment with a petrol-driven torpedo (of 23.5-in. diameter, manufactured in 1910 at Kure), and other novel types are reported to be in existence, though they may not be successful enough to justify their adoption for general use.—*Naval and Military Record*, 28 February, 1923.

UNITED STATES

A CORRECTION :—Attention has been called to an error in the description of the *Lexington* and *Saratoga*, on page 331 of the February issue of the Institute PROCEEDINGS. The speed of these ships has not been reduced as stated in the article reprinted from the *Scientific American* for December, 1922, but remains at 33 knots plus.—Editor.

NAVY SERIOUSLY DEFICIENT.—Serious deficiencies of the United States Navy under the 5-5-3 ratio adopted by the Washington Arms Conference will be called to the attention of the Sixty-Eighth Congress as soon as it convenes, it was learned officially at the Navy Department.

An expert survey of the international naval situation showing the American sea power to be between 300,000 and 400,000 tons short of its proper standing under the Conference agreement has given impetus to the work already under way on the program Secretary Denby is expected to submit, covering both ships and personnel.

With official opinion practically unanimous that the most pressing need of the Navy is for modern scout craft, it was predicted that immediate authorization would be urged for fast cruisers and submarines with additional tonnage of these types to be added annually for a definite period of years.

High naval officials have suggested that the "immediate program" comprise at least eight modern cruisers to supplement the ten of the *Detroit* class now under construction, three scout and three fleet submarines of 2,500 tons and three mine-laying submarines. At least two airplane carriers of the *Langley* type in addition to those already under way, also are included among the fleet units deemed immediately necessary.

Second only in importance to the need for auxiliaries, in the opinion of officials, is that for adequate personnel. This was brought home forcibly, it was said, in the gathering of the battle fleet for maneuvers when it was found necessary to order all the apprentice classes from their schools to the ships in order that the vessels might be efficiently handled. The apprentice courses were only three-fourths completed, when the students were taken from their studies.

Estimates of the deficiency of personnel under the present 86,000 authorization ran between twelve and twenty per cent with most officials holding the view that about 108,000 officers and men will be required to bring the fleet up to the most efficient standard.

The naval programs of the other parties to the 5-5-3 ratio will make the deficiencies of the American Navy more pronounced if action to correct them is delayed, according to officers who have analyzed information recently acquired on this subject. Great Britain lists fifty-six modern cruisers built and building, aggregating 296,000 tons, Japan twenty-five or 157,000 tons and the United States ten or 75,000 tons—of which three are for delivery at comparatively early dates.

Naval officials generally are of the opinion that the modernization of the capital ships, authorized by the last Congress, will place the first-line ships on a parity with any in the world and are prepared to concentrate on building up the auxiliary forces.—*Boston Evening Transcript*, 12 March, 1923.

SIX FLEET BASES SELECTED BY NAVY.—Development within a definite period of four continental and two "advanced" fleet bases has been decided upon by the Navy Department as an integral element of the national naval defense program.

The bases, selected by a special board on shore establishments, headed by Rear-Admiral Hugh Rodman, will be given a certain "priority" in development which has been determined after a study of every strategic consideration.

Under this schedule, they will be developed in the following order:

San Francisco—A base capable of "serving the entire fleet in all respects."

Puget Sound—A base equal to that at San Francisco and to include existing naval stations at that section.

The New York-Narragansett Bay—An all-fleet base to include stations now located in New York Harbor, Long Island Sound and Narragansett Bay, with construction of a channel through Hell Gate to permit ready passage of the largest vessels from the Sound to New York harbor.

Chesapeake Bay—An all-fleet base to include existing stations on the lower bay.

The outlying bases are the Panama Canal Zone and the Hawaiian Islands, the board having excluded from its recommendations "all shore stations in insular possessions where, under the limitation of armament treaty, the status quo must be maintained."

Limitations of specified types of ships under the treaty has been held by naval experts to necessitate certain modification in the position given these bases in the general strategic plans of the United States and to require a redrawing of plans for their development. Apparent decision of some foreign governments to press forward construction of the fast light ships which were not limited under the treaty is said to have directed attention to the importance of completing the program for the Canal and Hawaiian defenses in order to "balance" the scale.

Detailed plans and estimates of the cost for each base will be presented to the next Congress, along with recommendations for a building program designed to bring the navy up to its standard under the five-five-three ratio.

While completion of the fleet bases will be made the first consideration of the Navy Department, it was said officially today that preliminary work would be undertaken at the same time upon plans for the development of subsidiary shore stations. These include the various navy yards, submarine and destroyer stations, naval air stations for coast patrol duty, training stations and ammunition, ordnance and fuel depots.—*Baltimore Sun*, 11 March, 1923.

NOTES OF FLEET MANEUVERS.—Balboa, March 17—In the last two days the United States fleet has demonstrated to the congressional party that it is making the most of every dollar appropriated for it. Tactical maneuvers a hundred miles off Balboa, including a rehearsal of the Battle of Jutland, showed ships and men being used to the best advantage. Commencing today, after returning to port, some members of the party said it was unfortunate funds for sea practice are so limited. Appropriations by the last Congress for this purpose, totalling \$22,000,000, permit battleships and destroyers to steam only four and seven-tenths days a month, as compared with \$30,000,000 three years ago, permitting steaming ten days a month. Officers said scant appropriations are especially unfortunate at this time when approximately sixty per cent of the enlisted men are recruits. A single battleship with the fleet having a complement of

1,200 men has had 1,285 men pass through it in the last year. With new men and sea practice limited gunnery skill is seriously impaired. A sudden war would place the fleet at a serious disadvantage. The party inspected the fortifications of the Canal Zone today, and the members commented on the advisability of installing a battery of sixteen-inch guns on Toboga Island to strengthen the defenses of the Pacific entrance to the Canal.—*Boston Evening Transcript*, 17 March, 1923.

Aboard U. S. S. *California*, Panama Bay, March 19 (By Radio).—The necessity for a preponderance of light cruisers, destroyers and aircraft to protect the battle fleet was strikingly illustrated, in the opinion of naval strategists, by the results of two destroyer attacks on the Pacific Fleet today, which were witnessed by Secretary Denby and Representatives.

While neither assault carried any element of surprise, two super-dreadnaughts were theoretically put out of action during each phase of the maneuvers.

In the first attack nineteen destroyers attached to the "blue" fleet came over the horizon behind a smoke screen and launched fifty-seven torpedoes, two finding a mark on the *Idaho*, third ship of the "red" fleet, and one striking the *California*, flagship of Admiral Eberle's Pacific Fleet. Eighteen seaplanes sent out to bomb the destroyers failed to arrive before the torpedoes were launched. The battleships opened simulated fire on the destroyers, but officers said the attacking force was so well protected by the smoke screen that it did not afford much of a target.

During the second attack, which was staged without a smoke screen, nineteen destroyers again participated. They laid down a checkerboard of fifty-seven torpedoes, forcing the "red" fleet to deploy from its battle line. Two torpedoes struck the *Tennessee*, second ship in line, while another hit the *Idaho*, third ship.

Officers judged both out of action, the battleships, because of the haze, having difficulty in getting the range of the destroyer.

During each phase the "red" fleet had the aid of three light cruisers, which, however, were not protected by destroyers. Seaplanes did not figure in the second phase.—*Baltimore Sun*, 20 March, 1923.

MERCHANT MARINE

BOARD TO ADOPT NEW POLICY.—In view of the definite abandonment of the ship subsidy bill, Chairman Lasker after a conference with President Harding announced last Monday that "the Shipping Board has a very definite, practical program for the Government-owned merchant fleet which will be announced within a few days. It will be found to be as novel as it is surprising." Mr. Lasker described the program as a "radical departure" from the policy now being pursued, but declined to give any detailed information regarding the intended move.

The new plan will be announced promptly as it is only fair to private American shipowners that they should know as soon as possible what the Government's policy is to be. It is generally believed that a withdrawal of part of the Fleet Corporation's tonnage from the least paying routes is contemplated as well as modification of the M O 4 agreement. A change in the Board's ship sale policy is also anticipated.—*Nautical Gazette*, 3 March, 1923.

BOARD AT WORK ON NEW PLAN.—Chairman Lissner of the Shipping Board's committee which is drafting a plan for the disposition of the Emergency Fleet Corporation's tonnage, has appointed an advisory committee of ten official experts to work out the details of the Government's new shipping policy. The advisory committee includes President J. B.

Smull and Vice-president W. J. Love, J. E. Sheedy and William B. Keene, of the Emergency Fleet Corporation; S. H. E. Freund and Chauncey Parker, of the legal department; Colonel J. W. McIntosh, director of finance; Sidney Henry, director of sales; R. T. Merrill, chief of the division of research, and J. A. Robinson, assistant to Mr. Smull.

It is Chairman Lissner's intention to have the main committee meet twice weekly with the advisory committee and to speed up the formation of the general plan. Later on private ship operators and other interested parties will be called in for an exchange of views on the subject of the future of the American merchant marine.

Commissioner Lissner's committee is now engaged in a careful check of the financial status of every Government vessel now in operation, with a view to determining how much their voyage losses were and to ascertain if any netted a profit at any period during their service. A preliminary survey of the financial record of Government tonnage already made indicates that in some instances vessels reported income in excess of expenses during some months, but on the year's account the receipts did not meet expenses.

It is generally believed that the Shipping Board will ultimately decide to scrap a considerable portion of its fleet and to charter the remainder to managing agents on a flat rate basis with some special form of compensation for the operation of ships on unprofitable routes. The Government's fleet consists today of 1,385 vessels of all types. It is composed of forty passenger ships, eighty tankers, twenty-four tugs and 1,241 freight vessels. The Board is now operating in its freight service about 346 cargo carriers. Of the remainder 400 may be found only fit for scrapping, while 320 are lake type boats of less than 4,200 deadweight tons. These would probably prove attractive to foreigners for service in the Mediterranean and in the Baltic.—*Nautical Gazette*, 17 March, 1923.

BRITISH GOODBYES TO OUR SHIP SUBSIDY.—Predictions of failure made long ago by certain British editors in their comment on America's attempt to build up her merchant marine are recalled in connection with the final rout of the Ship Subsidy Bill and the decision to place 1,700 vessels on the market. This is the end of the "vastest and most futile attempt in history to create artificially a new industry," remarks the London *Daily Chronicle*, which believes it to be the "greatest recorded failure of the protectionist theory in practice and consequently the greatest triumph for free trade in America." Besides the colossal money loss this paper mentions with no apparent regret the "collapse of a dream which would have put the American flag in every port in the world and on all its seas, the failure of a grandiose national effort in the furtherance of which the Government strained to the utmost its influence and resources and threw into the scale its official authority and unique propaganda." The *Chronicle* advises us further that:

"The dream has been shattered finally by the American taxpayer, but it is true that the causes of failure are economic, not political. They are simply these: That America could not build ships as cheaply as we could or as well; that she could neither run them nor man them as we do; that it is beyond the power of our Government or of any Government to create a carrying trade artificially; that Washington has made the same mistake with shipping that Moscow has made with industry.

"Naturally British shipping will benefit. So long as these American ships were run as they were being run for the purpose of forcing an opening of doors for American traffic and not for legitimate profit, and so long as the American citizen was patient enough to pay out of his

pocket for the experiment, it was useless to hope for recovery in the shipping trade.

"A new chapter now opens for the British Mercantile Marine. At the same time a chapter closes in economic history that has its lesson, not only for America, but for all who have the intelligence to read it."

But there is no rejoicing or grandiloquent "I told you so" in the tone of the London *Daily Telegraph*, which declares that the whole record of nationalized shipping is one of failure, and it adds:

"If any people could have succeeded, the Americans with their acumen and commercial keenness would have done so.

"What the next step will be, now that the Ship Subsidy bill has been dropt, is uncertain. It may be that these ships will have to be got rid of at bargain prices as opportunity offers, and in that event the loss may come to be regarded in much the same light as we look upon the hundreds of millions we spent on the prosecution of the Great War. We are convinced that it was worth the price, and the American people, having shared even such sufferings as we had to endure from bombardments and air raids, may come to much the same resigned state of mind as we have reached.

"In any case we may signal this message across the Atlantic: The American shipbuilding effort, a splendid vindication of the spirit of the people of the United States, will never fail to evoke feelings of gratitude and admiration in this island country."—*Literary Digest*, 17 March, 1923.

EFFICIENT MERCHANT MARINE VITAL AS A NAVY RESERVE.—It is to be profoundly hoped that some way will be found to preserve an American merchant marine in spite of the failure of the Ship Subsidy bill. Merchant ships and merchant seamen constitute an indispensable war reserve for the Navy.

Apparently the Administration intends to continue the operation of certain government-owned ships under the Shipping Board. Of course, this must be done at a loss more than sufficient to cover the expenses of a subsidy. It amounts to a subsidy in another form and is amply justified for the sake of naval preparedness.

But government operation at a steady loss is rather a precarious basis for a merchant marine. Any Congress may decline the necessary appropriations and terminate the whole arrangement. Some form of privately-owned ships is essential to a permanent institution.

It is understood that the placing of a number of American ships under the Panama flag is contemplated by their owners as the only basis upon which they can operate at a profit. This is better than having a deficiency of American-owned ships available in case of war. But such a solution of the difficulty fails to meet the needs as to reserves of personnel, since most of the crews will become foreign.

The best alternative to provide both ships and personnel seems to lie in an extension of favorable regulations and laws for coastwise service from which foreign vessels are now excluded. Such coastwise traffic should be extended so as to include not only commerce between ports on a home coast and intercoastal commerce, but also traffic between the United States and all its colonial possessions, not excepting even the Philippine Islands. Moreover, the coastwise trade, as so extended, should be given preferential rates for passage through the Panama Canal. In this way a large American merchant marine could be built up and placed on a sufficiently permanent basis to meet the necessities for a reserve for the national defense.—*Army and Navy Journal*, 17 March, 1923.

SHIPPING BOARD TO RECONDITION FOUR LINERS.—While it has been rumored for some time that the ex-German liners *Mount Vernon* and *Ag-*

memnon were to soon undergo reconditioning, the recent announcement from the Shipping Board that actual authorization has been given for the work, has served to dampen the pessimists who have been predicting that these much-needed contracts would fail to materialize. But this was by no means all of the good news handed out by the Board, for, in addition to the ships mentioned, it is stated that the *America* and *President Buchanan* are also to be put in first-class condition, to compete successfully with our shipping rivals, under the management of the United States Lines.

Though the Board has been somewhat reticent in taking the people into its confidence as to its plans for the general protection of the American Merchant Marine, now that the Shipping Bill has been shelved, there is strong reason to believe, from the action taken in connection with these ships, that the policy finally decided upon will be in line with the widely expressed sentiment among American shipping men everywhere, that there shall be no let up in the fight for an adequate American representation in the lanes of ocean commerce.

When completed, these vessels will be operated by the United States Lines in the North Atlantic, and will run in conjunction with the *Leviathan* and *George Washington*.

The *Agamemnon* and the *Mount Vernon* will be converted into oil burners, and when finished will be the equals of any vessels afloat in point of equipment. The plans and specifications are now being prepared and call for the most modern furnishings. When put into operation they will carry approximately 900 first and second class passengers and 500 third class, with a crew of 550. These vessels are approximately 700 feet long, with a gross tonnage of about 20,000 tons and have a speed of 23 knots.

In addition to the *Agamemnon* and the *Mount Vernon*, the *President Buchanan*, formerly the *President Grant*, is to be reconditioned as an active ship of the highest type. She is a vessel of approximately 600 feet long, a beam of sixty-eight feet, and a tonnage of about 20,000. Plans and specifications have already been issued to the bidders, and bids for the work of reconditioning are to be opened about April 1. The plans contemplate additional boiler equipment, the installation of a fuel oil system and the reconditioning and overhauling of mechanical equipment throughout. With the installation of the fuel oil system she is expected to make 15 knots.

When completed, the *President Buchanan* will carry approximately 700 cabin passengers and 1,400 third-class passengers. The third-class accommodations will be the finest in the world.

Plans and specifications for the reconditioning of the *America* have been issued and bids will be opened for this work on March 9.—*Marine Journal*, 3 March, 1923.

TODDS TO BUILD NEW DRY DOCK.—The directors of the Todd Shipyards Corporation have approved the construction of a new dry dock capable of accommodating vessels ranging from 40,000 to 50,000 gross tons. The new dock will be one of the largest in the world and will be able to handle most of the great passenger liners.

The new structure will be built at Brooklyn, and dredging for the site as well as preliminary construction, will begin at an early date. Completion of this dock will give to the Todd Shipyards Corporation in Atlantic, Gulf of Mexico and Pacific coast ports a total of twenty-three floating drydocks and two graving docks—one of the largest aggregations of ship building and repair facilities possessed by any one firm in the world.—*Nautical Gazette*, 24 February, 1923.

ENGINEERING

RELATIVE MERITS OF THREE METHODS OF CHARGING BATTERIES.—As is generally understood, the constant-current method of charging both lead and nickel-iron batteries consists in connecting a variable resistance in series with the battery and connecting it to a charging circuit having any voltage higher than the full-charge voltage of the battery. The charging current is maintained virtually constant throughout the charge at the normal charging rate. This is accomplished by varying the resistance in series with the battery, adjusting it to give a current value slightly higher than the normal charging rate and, after the current has fallen off to a value below the normal rate, again adjusting it to a slightly higher value, thus maintaining an average equal to the normal charging current.

With a nickel-iron alkaline battery the charge is terminated when the voltage reaches approximately 1.85 volts per cell. In the case of a lead battery the charge is continued at the normal rate until free gassing begins, accompanied by a comparatively rapid rise of voltage, when the charging current is reduced to the finishing rate, which is somewhere between twenty-five per cent and forty per cent of normal, depending on the make of the battery. This results in simultaneous reduction of the battery voltage, and the charge is then continued at the finishing rate until the battery voltage reaches a one-hour maximum as indicated by three half-hourly readings of equal values, the current being held constant, after which the charge is terminated.

In order to keep the charging current practically constant it is necessary to adjust the resistance at more or less frequent intervals, these intervals being dependent on the difference between the battery and the line voltage. With a battery having a voltage slightly lower than the line voltage, as, for instance, a battery of forty cells being charged from a 110-volt current circuit, it will probably be necessary to adjust the rheostat at half-hour intervals; but for a similar battery being charged from a 220-volt circuit adjustments may be made at very much longer intervals. Observations of gassing and readings of battery voltage must be taken at suitable intervals to determine the points at which to reduce the rate and terminate the charge.

The chief objection to the constant-current method is the necessity for keeping a competent attendant to regulate the current from time to time and take voltage readings. If he is not attentive to his work, the batteries under his care will probably be either overcharged or undercharged, and in either case their useful life will be shortened.

This objection to the constant-current method is not inherent in the constant-potential method of charging, the basis of which lies in the fact that a proper charge for any lead battery can be obtained by applying a fixed charging voltage of approximately 2.3 volts per cell.

In charging batteries by the constant-potential method the battery, without series resistance, is connected directly to a circuit, the voltage of which is maintained constant throughout the charge at a value determined by the number of cells in the battery. For lead batteries this voltage is ordinarily about 2.3 volts per cell and for nickel-iron batteries 1.7 volts per cell. In cold weather a somewhat higher voltage may be required. Under these conditions the time required for charging a battery which has previously delivered its rated output can be reduced to five or six hours in the case of a lead battery. Seven hours, however, is required for a total charge for a nickel-iron battery. This time is not changed regardless of the method of charging used, as the average rate of charge is equivalent to the normal rate. Owing to the fact that the battery voltage is low at the start of the charge, the charging current tapers, starting at a high value and falling off as the charge progresses. In the case of the lead battery

the initial inrush current is about four times normal, and it is about twice normal for the nickel-iron battery.

The constant-potential method of charging requires a definite constant charging voltage for each battery, which voltage seldom, if ever, corresponds to that of a power circuit. It is therefore necessary to install a separate power supply or provide some special means of obtaining the proper charging voltage. Where batteries of different numbers of cells are used, the problem is more complicated as a different charging voltage may be required for each battery.

In the case of lead batteries an objection to this method of charging is the fact that the capacity of all the conductors must necessarily be increased about 300 per cent in order to provide capacity for the inrush current, which lasts only a few minutes. All fuses or other overload devices must also have a capacity for the maximum current and thus be useless as a protection throughout the remainder of the charge.

By inserting a resistor in the battery circuit, this heavy initial inrush is cut down to the point where heavy leads, switching equipment and fuses are not necessary. This is known as the fixed-resistor method of charging, and retains the chief advantages of the constant potential method.

The chief advantage of fixed-resistor charging is that the expense of keeping a responsible attendant on duty is saved since no attention is required during the charge; and, as the battery automatically receives the proper amount of current at every stage of the charge, it receives better treatment than when charged by any method which depends upon the operator to adjust frequently the charging current at the proper value and to terminate the charge. This elimination of the human element is a strong argument for fixed-resistor charging with automatic ampere-hour meter cut-off, as the useful life of the batteries is probably shortened more often by improper charging than by any other cause.—F. LePort Spangler, *Electrical World*, 13 January, 1923.

STEAM FROM TWIRLING BOILER-TUBES.—Rotating boiler-tubes are a feature of a new high-pressure Swedish boiler. The motion throws the water into a tube-like shell and facilitates the generation of steam. Pressures in steam power plants have been constantly increasing. Knowing that higher steam pressures meant increased efficiency, with a corresponding saving of fuel, each generation has gone as far in this direction as seemed advisable. In recent years the rapidly increasing cost of fuel has been paralleled by a corresponding increase in steam pressures until today a pressure of 250 pounds per square inch is common practise in large central stations, while a few American plants are operating in the neighborhood of 500 pounds. But all of these pressures sink into insignificance when compared with the 1,500 pounds which the new Swedish boiler, the "Atmos," is designed to carry. This boiler, as described in *Power* (New York) by Edwin Lundgren, a consulting engineer of Stockholm, Sweden, departs radically from all previous designs. Perhaps the most surprising thing about it is the generation of steam from the tube-like shells of water produced centrifugally by rotating the boiler-tubes rapidly on their axes. Describing this boiler, which was designed by J. V. Blomquist, another Swedish engineer, Mr. Lundgren says:

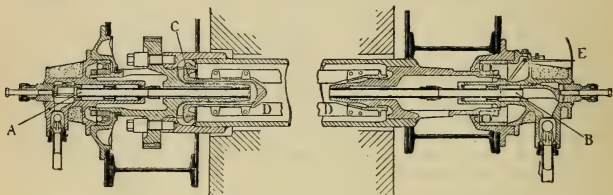
"Each of the boilers (halves of a twin boiler) is calculated to generate 16,500 pounds of steam per hour at 1,500 pounds pressure and a temperature of 700 degrees F., and is provided with eight 'rotors' which have an outside diameter of 1 foot and $\frac{3}{4}$ -inch walls. The total heating surface of each boiler is thus 280 square feet. The rotors extend through the brickwork and are supported in bearings, which in turn are carried by a frame of structural steel. A bracket attached to this frame supports an

electric motor of eight horse-power, which drives, by means of spur gears, all the rotors at a speed of 330 revolutions per minute.

"The flue gases, after passing the rotors, are first utilized to heat the superheaters, then the high-pressure water economizers and, finally, the low-pressure economizers, in order, thereafter, to escape into the chimney at a temperature of 350 to 400 degrees F., corresponding to a boiler efficiency of eighty per cent."

The feed water is admitted through a small central tube which turns with the rotor. There is a similar tube at the other end for the steam outlet, both tubes being provided with special stuffing boxes packed to remain tight against the 1,500-pound pressure while the rotor is in motion. After describing the various regulating and safety devices, the article concludes:

"All the devices and constructions described have passed the first experimental stage and have stood the test of actual service. The attached photograph shows the first experimental installation located at the Carnegie Sugar Refining Works, at Gotenburg, Sweden. Here the steam is generated at a pressure of 900 pounds per square inch. The boiler has been in continuous daily service under rather unfavorable conditions ever since December, 1921, and has given entirely satisfactory results."



THRICE AS POWERFUL AS OUR BIGGEST BOILERS

The new Swedish rotating boiler which will furnish steam at 1,500 pounds pressure. Each boiler has eight twirling "rotors," one of which is here shown in cross-sections displaying the feed connection (left) and steam connection. They rotate at a speed of 330 revolutions per minute.

Commenting editorially on this boiler and on high pressures in general, *Power* says:

"Much credit must be given to the inventor for his courage in breaking away from all tradition, even to the extent of rotating the tubes. No one should blame American engineers, however, if they are at first a little skeptical as to the safety and reliability of the arrangement used. They will naturally wonder what would happen if the driving motor should stop, thus allowing the centrifugal shell of water to fall to the bottom of the 'rotor.' Another question will be as to the extent of the disaster if a rotor should explode.

"All these things must be considered, but they should not lead to hasty conclusions with regard to this particular boiler or high pressures in general. The wise ones will keep in mind the builders of wooden ships, who laughed at the idea that ships would ever be made of iron. They may hang on to their own money while the other fellows do the experimenting, but they will not fail to keep informed on every new development in this field."—*Literary Digest*, 17 March, 1923.

HOW DUTCH YARD LAUNCHES SHIP IN NARROW SPACE.—The launching of vessels in restricted spaces is a difficulty which has to be faced at the Royal "De Schelde" Dockyard, Flushing, in that the ships have to be launched down the middle of a comparatively narrow canal, writes Mr. W. Hamilton Martin. The method of launching adopted there to accomplish this in a satisfactory manner is of interest. The two large slips are situated at the head of a canal which has a constant water-level normally; the level, however, can be raised to suit launching purposes. As this canal is only 170 feet wide, special care has to be taken that the vessel to be launched is brought up without running into the canal banks. In larger vessels there is not sixty feet between each side of the ship and either bank.

The trouble is not so much, therefore, in the actual run available as from the width of the canal. There is a clear run of about 500 yards from the ways, so by dropping the anchors attached to the cradle and sliding ways directly after the vessel clears the ends of the standing ways, there is room for the vessel to carry on and clear the cradle, etc. No drags are used for bringing up the vessel, but she is made to run into a very large floating raft—about sixty feet by sixty feet and ten feet thick, built up of fagots all carefully bound together—of which one-third floats above water.

The size of the raft is regulated according to the size and launching weight of a particular vessel, from experience previously gained, and it is held by guy ropes nicely square to the line of travel of the ship, which rams it with her stern. This comparatively soft mass of wood then piles up and closes around the stern and propeller or propellers of the ship which firmly hold it, and the whole mass, with its large area offered to the water and its great weight to be set suddenly in motion, acts as a very powerful retarding agent, and invariably brings the ship up in a distance of from 100 to 150 feet.

In the event of the ship leaving its intended course through some unforeseen circumstance, the cushion of faggots closely packed around its stern acts as a thorough and kindly fender to the ship and the bank if they come into contact. At the worst, the blow will be a glancing one, insuring little damage to either. The vessels are generally launched with rudder and propellers all fitted, while some strengthening beams are added to keep the rudder amidships, and to take the first impact with the comparatively soft raft and to protect the propellers. For nearly fifty years this method has proven satisfactory. Only once did a vessel swing clear of the raft after striking it, but she came to rest in the wood-clad earthen banks with more noise than actual damage to herself. This method would be impracticable in a busy waterway apart even from the fact that the tide would prevent the raft from keeping a definite position.—*Nautical Gazette*, 17 February, 1923.

AERONAUTICS

ARE HUGE AIRCRAFT CARRIERS WORTH WHILE?—The description published in this journal dated December last, of the changes made in the design of the battle cruisers *Lexington* and *Saratoga* to equip them for their new rôle as aircraft carriers, raises anew a question which has been discussed in British naval circles for some time past, namely, whether it is sound policy to employ as floating airdromes vessels of very large dimensions. As the arguments against this policy certainly appear to deserve considerations, it may be worth while to summarize them here.

(1) Huge aircraft carriers are to be deprecated on economical grounds. As each unit costs a great deal of money, the total number of such vessels must in any case be limited, irrespective of the restriction imposed by

the Washington agreement. Would it not be better to build three medium or four comparatively small carriers in place of two very large ones? For the cost of building one *Lexington* it would, no doubt, be possible to build two ships of the British *Hermes* type, 10,950 tons. Moreover, to concentrate practically one-half of the aviation material of the fleet into one ship is to put "all the eggs in one basket," and a somewhat fragile basket at that. A ship cannot be in more than one place at a time, and it is not difficult to visualize occasions when the possession of one or two additional aircraft carriers would make all the difference between success and failure in executing some problem of strategy or tactics. Another fact to be remembered is that the enemy naturally make a determined attempt to destroy or disable these huge floating airdromes, knowing that the loss of one would be a terrible blow to the other side by depriving it of half its air force and thus rendering it partially blind. For this reason such ships would become the target for concentrated attack by submarines, aircraft and other weapons.

(2) The aircraft carrier is exceedingly vulnerable, in that superficial injury which would not impair the fighting power of an ordinary battleship or cruiser might put the carrier out of action. If the flying-off deck were holed by bombs or bursting shell, even of small caliber, machines could no longer alight on it, and the power to do this is the chief justification for building very large carriers. The spacious deck of the *Lexington*, for instance, would present an inviting mark for bombing airplanes and long-range gunfire, and one direct hit might tear a huge gap in the light plating, making it a death trap to descending machines. The recent experiments with the British battleship *Agamemnon*, which was bombed from the air when steaming at 15 knots under radio control, showed that a good percentage of hits can be reckoned with even when the attacking planes keep at a great height. The *Lexington* would, of course, offer a target nearly four times as large, and in time of war attacking planes will take big risks in order to get their bombs fairly on the mark.

(3) The only advantage the *Lexington* has over the *Hermes*, a ship of two-thirds less displacement, is her ability to act as a landing ground for homing airplanes and her greater capacity for housing planes; but the first advantage might be nullified by a lucky hit in the opening engagement of the war, while if the ship were sunk the loss of aviation material would be proportionately greater. In any case, many naval officers regard it as unnecessary to make special provision for the landing on deck of airplanes after fight. This is no easy performance under the most favorable conditions prevailing in peace; it would be infinitely harder to accomplish under the conditions of battle, with the carrier probably steaming at full speed, making frequent changes of course, perhaps under a heavy fire, and half obscured by shell splashes and powder fumes. The probability is, therefore, that in time of war an airplane which had once left the carrier could not return to it, and must either be abandoned or left in the water until an opportunity occurred for salvaging it. If this view be accepted, the principal argument in favor of huge floating airdromes ceases to have any point, for airplanes can be launched with ease and safety from ships of relatively small dimensions, as has been proved in actual practice.

The British Navy has two big aircraft carriers: the *Eagle*, an ex-battleship of 22,790 tons; and the *Furious*, ex-battle cruiser, of 19,100 tons. But its most successful carrier is the *Argus*, of 14,450 tons, and it is significant that in the *Hermes*, the first ship *specially designed* for this purpose, and not converted as the others were, the Admiralty did not go above 10,950 tons. The impression in Europe is that the former Ameri-

can and Japanese battle cruisers are being transformed into aircraft carriers less on account of their inherent fitness for this work than because it furnished means of saving these valuable ships from the junkpile and adding floating airdromes to the respective navies more quickly than would have been possible if entirely new ships had to be designed. Probably, also, it was easier to obtain appropriations for converting the half-finished ships in question than for new construction.—Hector C. Bywater in *Scientific American*, March, 1923.

ANTI-LIGHTNING PROTECTION FOR BALLOONS.—During recent years as many as four kite observation balloons used by the United States Navy during fleet maneuvers have been destroyed by lightning. The loss entailed represents approximately \$50,000. Numerous other lighter-than-air craft have been destroyed by certain agents, the identity of which has never been definitely proven.

A study of the effect of lightning on kite balloons has been carefully made by the Navy Department, and it has been found that certain conditions exist on board lighter-than-air craft when suspended at different heights and subjected to the effect of passing clouds or changes in atmospheric conditions. This effect induces electrical charges on the balloon body which in certain cases give rise to electrical sparks which ignite the fabric and in turn explode the gas used in the balloon. To overcome the effects of lightning on kite balloons, the Navy Department has developed a special protective device which keeps the electrical discharges off the surfaces of the balloon and passes them to ground, thus producing a sheltering screen over the body of the balloon. Such a system can also be applied to airships and it is believed that the use of this device will prevent destruction of these vessels and make for safer navigation of lighter-than-air craft.—*Aviation*, 5 March, 1923.

THE AIR PARLIAMENT.—A number of excellent papers were read at the Air Conference last week, and the whole proceedings were conducted in a spirit of enthusiasm which augurs well for the future of national aviation. In Sir Samuel Hoare we have an Air Minister who may be counted on to do everything possible for the promotion of air interests. He, however, like his predecessors, is handicapped by the financial restrictions imposed by the Treasury, and with the best will in the world it is impossible to build up an adequate air force on the meagre funds now available. All Governments are very much alike when it comes to spending money on defense; they rarely move until pushed by public opinion. The present Government has not, thus far, displayed any more interest in the air question than the late one did, and the fact that the Minister responsible has no seat in the Cabinet necessarily limits his influence, however enthusiastic he may be personally.

What is needed is a widespread agitation for proper air defense. The country must be told that, at the present time, it has no real protection against this form of attack, the deadly nature of which increases year by year with the continuous development of aircraft and the weapons they use. The general public does not yet realize that the Navy and the Army, essential as both are to the defense of homeland and Empire, can do practically nothing to protect our cities, ports, and factories from devastating bombardment. Though the Navy were in undisputed command of the sea and the Army mobilized at full strength, their combined efforts could not deflect a single bomb from the sky. Our age-old first line of defense has broken down, and we have nothing to put in its place.

The scheme for a self-supporting airship service, which would be at the disposal of the Admiralty in time of war, was set forth in detail in

the paper which Commander Dennis Burney read at the Conference. It appears from this that the proposed airships will not be of excessive dimensions. The type in view would be about 760 feet in length and 110 feet in diameter. Allowing a good margin for ruggedness of construction and for the contrary winds that might be met with in a long passage, each ship would be capable of transporting 207 passengers and ten tons of mail or other freight a distance of 3,000 miles at a speed of eighty miles per hour. The scheme provides for the building of fuel depôts and mooring bases at Port Said, Bombay, Rangoon, Singapore, and Perth (Australia). Whether these "mooring bases" are to be sheds or only mooring masts was not explained, but, as we pointed out last week, it would be necessary to have sheds available at strategic points if the airships were to be of any real use to the Navy.

We are not greatly impressed with Commander Burney's eulogy of the airship as a carrier of fighting planes, or, indeed, with its potentiality for war service of any kind except scouting. In view of the extraordinary development of heavier-than-air craft and the practical certainty that in a few years' time there will be military aeroplanes having twice the speed and equal climbing power, and heavily armed with bombs and shell guns, it seems to us incredible that the airship can escape destruction if it is employed anywhere near the war zone. While, therefore, it may be good policy to spend £230,000 a year on securing for naval use a fleet of airships capable of acting as scouts, some will question the wisdom of spending a penny on these vessels before we are adequately provided with heavier-than-air craft.—*Naval and Military Record*, 14 February, 1923.

ORDNANCE

RANGES OF TURRET GUNS NOT TO BE INCREASED (?)—Washington, March 20.—Retraction was issued today by this Government of statements publicly and officially made that, since the disarmament conference, the British Admiralty had greatly increased the gun range of their capital ships, rendering them more formidable than American ships of corresponding design.

Secretary of State Hughes, who had made statements to this effect in his New Haven speech, upon the authority of the Navy Department, was the first to recant. An hour later Acting Secretary of the Navy Roosevelt followed suit with an explanation that navy's misinformation had come from sources believed to be "reliable."

Both declarations were prompted by a categorical denial on the part of the British Government, transmitted through the Washington embassy, that any alteration whatever had been made in the elevation of the turret guns of any British capital ship since originally placed in commission or that any additional deck protection has been provided.

Meanwhile, however, the Navy Department went to Congress a few months ago asking for \$30,000,000 with which to bring the capital ships of the American Navy up to the supposed range of the dreadnaughts of the British Navy. On the strength of representation made by naval experts at that time Congress provided a total of \$6,500,000 with which to begin the alterations.

The Navy Department announced informally that, in view of the official information from London, this sum would not be expended. Unless Congress authorizes its diversion to other uses it will revert to the Treasury. The department has no authority to apply it in any other direction.

That the British had taken exception to this Government's statements and policies was first known this afternoon when Secretary Hughes made public the following statement:

"In my speech at New Haven on December 29, 1922, I made the following statement with respect to alterations in the British capital ships: 'The result is that in a considerable number of British ships bulges have been fitted, elevation of turret guns increased and turret loading arrangements modified to conform to increased elevation.'

"In making this statement I relied upon specific information which had been furnished me by the Navy Department and which, of course, the Navy Department believed to be entirely trustworthy.

"The Department of State has been advised by the British Government categorically 'that no alteration has been made in the elevation of the turret guns of any British capital ships since they were first placed in commission, and further 'that no additional deck protection has been provided since February 6, 1922, the date of the signing of the Washington treaty.'

"It gives me pleasure to make this correction, as it is desired that there should be no public misapprehension."

As Secretary Hughes explains, his references to the action of the British Admiralty were based entirely upon information given to him in good faith by the Navy Department. That department in turn received its information, it is intimated, from the naval attaché of the American Embassy at London, each department in turn "passing the buck."

The Navy Department's statement was brief, but it, too, accepts the assurance of the British that this Government was misinformed. Here is what Acting Secretary Roosevelt has to say about it:

"That Navy Department in the hearings before Congress stated that the elevation of the turret guns of the British capital ships had been and were being increased. This statement was based upon information believed to be thoroughly reliable by the department.

"The British Admiralty has informed the department that this is not the case and that the elevation of the turret guns on the British capital ships is the same as when those ships were originally commissioned. This places the matter beyond further question, and the department takes pleasure in correcting its previous statement in consonance with the above."

It is stated further unofficially that in the British fleet as provided for in the disarmament treaty there is one capital ship with a range of 30,000 yards and twenty-one ships with a range of 21,000 yards. In the American Navy there are five ships with a range of 30,000 yards and thirteen ships with a range of 21,000 yards.

The general understanding seems to have been in Washington that the British proposed to increase the range of their 21,000-yard guns to 30,000 or thereabouts, which would have put our fleet largely at the mercy of the British. The Navy Department, therefore, proposed to overhaul its thirteen ships, which now have a range of 21,000 yards, to increase their range to 30,000 yards.

One of the curious circumstances about this incident is that the British waited so long to set the American Government straight upon this matter. The Hughes New Haven speech was made just before the first of the year and the Congressional hearings took place somewhat earlier.

No question has ever been raised by this Government, however, as to the right of the British to make the turret alterations under the terms of the Washington treaty. This right was freely granted, but the argument was that this Government should take advantage of the same right, a view which Congress finally adopted.—*Baltimore Sun*, 21 March, 1923.

RADIO AND NAVIGATION

FLOATING WEATHER BUREAU ON THE ATLANTIC.—A floating weather bureau, to assist in protecting the lives of the many thousands of per-

sons and millions of dollars' worth of property at sea, is regarded as almost an accomplished fact, through co-operation between the United States and France.

Edward H. Bowie, chief forecaster of the United States weather bureau, said from New Orleans, Sunday, aboard the French merchant marine training ship *Jacques Cartier*, bound for Antwerp, in company with Professors Coyecque and Adeline, experienced meteorologists and forecasters, who are members of the corps of instructors on the training ship.

During the voyage, which will occupy about twenty days, the *Jacques Cartier* is acting as the floating weather bureau of the United States and French governments and is sending broadcast by radio forecasts twice daily, for the benefit of all vessels within reach.

Major Bowie and his French colleagues, during the voyage, plan to conduct their sea-going weather bureau much the same as the forecasting headquarters at Washington and Paris. The radio operators receive from all vessels within range the state of the wind and weather, and at 10:30 in the morning and in the evening, the powerful Arlington radio station of the United States Navy sends them the data of continental United States and Canada, while the long-range Eiffel tower station at Paris gives data of European stations. These observations are charted and forecasts prepared for the ensuing twenty-four hours over the Atlantic.

Major Bowie, upon reaching Europe, will visit headquarters of the meteorological services at Paris and London, for conferences with regard to increasing by means of weather forecasts the safety of navigation on the Atlantic and other oceans. The United States navy has indorsed the project and is assisting in every way possible.—*Associated Press*, 13 February, 1923.

NEW LIGHTHOUSE APPARATUS FOR PORT SAID.—We were invited earlier in the week to inspect at the works of Chance Brothers and Company, Limited, at Smethwick, a new apparatus which that firm has constructed for the lighthouse at Port Said, and which consists of a lens, with its mercury float pedestal, revolving clockwork mechanism and burners. The lantern, of 12ft. 9in. internal diameter, inside which the apparatus, etc., will be placed, has already been dispatched to Port Said.

The illuminant is an incandescent oil burner of the latest type, giving a very high intrinsic brilliancy, and it will replace the existing electric lamp, with, we are informed, a resulting large economy in cost of upkeep and attendance. The beam from the new lens will be about 1,250,000 British candles, which will give a luminous range of between ninety and 100 miles in clear weather in the Mediterranean. The height from the sea-level to the focal plane of the light when erected on the tower will be 124ft., and this will give an actual geographical range to a vessel at sea twenty-four miles.—*The Engineer*, 23 February, 1923.

NEW DAY MARK FOR ANCHORED POWER VESSELS.—A new Federal regulation, governing steamers and other steam craft at anchor, has been promulgated by the United States Steamboat Inspection Service and has been approved by the Assistant Secretary of Commerce. According to this new rule, vessels propelled by machinery which are moored or anchored shall display by day, forward where it can be best seen, one black ball or shape not less than two feet in diameter.

This rule was added to the regulations of the Steamboat Inspection Service in compliance with a recommendation made by the Maritime Association of the Boston Chamber of Commerce last May, which urged the adoption of a day mark on steam vessels lying at anchor in order to further safeguard the movements of other vessels. It was brought out in

the letter recommending this adoption that it is frequently very difficult to see whether vessels are at anchor or moving slowly until other vessels approach too close to keep clear.—*Nautical Gazette*, 10 March, 1923.

SEA-GOING LABORATORY URGED TO AID SAFETY.—Washington, March 12.—An experimental ship specially fitted for research in marine physics is proposed by Dr. L. V. King, of the National Research Council's Committee on Acoustics, as an important step toward the reduction of the yearly toll of lives and property resulting from preventable accidents at sea. The improvement in the design of aerial and submarine sound generators offers a large field for scientific effort, he said, and the first cost of equipment to make such study would be more than repaid by the lives and property saved.

The installation at the Fire Island Light, near New York Harbor, of synchronous signaling by radio-telegraph and by submarine sound he cited as an example of the kind of things which could be done. This apparatus sends out a series of dots automatically through the ether and through the water, the intervals between them corresponding to the time taken for sound to travel say 1,000 feet.

The ship operator has his telephone connected to the aerial and to a hydrophone. It he counts the number of dots reaching the apparatus before the first of those traveling by water reaches his hydrophone, he evidently obtains at once the distance from the source, reckoning 1,000 feet per dot.

If his ship is also equipped with a wireless direction finder, he knows his exact location and can thus steer a safe course in fog.—*Baltimore Evening Sun*, 12 March, 1923.

MISCELLANEOUS

U. S. NAVY CAN HELP TO KEEP ASIA QUIET.—London, March 1.—In a previous article I referred to certain criticisms which have been raised in America against the soundness of the policy of averting war in the Pacific by maintaining a strong navy. It has been argued by one correspondent that the "*si vis pacem, para bellum*" theory no longer holds good, having been thoroughly discredited by recent history, and that consequently it would be futile and irrational to pay enormous sums for the upkeep of a big fleet in peace time.

But the premise that preparedness affords no guarantee against the risk of war is open to question. It is true that when armaments are allied with an aggressive foreign policy they constitute a real danger to peace. For example, while Germany was building up a powerful fleet and maintaining the greatest army in the world, her rulers were making truculent speeches and revealing by word and deed their intention of imposing their will on Europe by brute force. One might also find in the present attitude of France a further instance of the consciousness of armed strength inducing a provocative policy toward neighboring states.

In this discussion, however, we are dealing not with the Old World but with the new, and, therefore, with a fundamentally different political *Weltanschauung*. Whether one agrees or disagrees with American aims and ideals, no unprejudiced spectator can deny that they spring from a deep-rooted love of peace for its own sake. The United States has sometimes been charged with pacifism, but never, so far as I know, has she been accused of harboring warlike designs in any quarter of the globe.

Nor is there any reason to anticipate a departure from this traditional American policy of regarding war as an unmitigated evil, to be avoided by any means short of a sacrifice of national honor. Even when Mr. Josephus Daniels was agitating for "the biggest navy in the world" no one

in England construed this movement as a threat. Rather was it viewed as an extreme and possibly ill-timed expression of America's resolve to discourage would-be disturbers of the peace, whether in Europe or in Asia.

If, therefore, the United States were to begin developing her navy up to the limit permissible under the Washington treaty—and at the present time it is far below that limit—she could not be suspected of cherishing military schemes. The idea that any American Government likely to be elected within the discernible future would knowingly pursue a policy antagonistic to peace is too grotesque to be worth a moment's notice.

We shall therefore be safe in concluding that whether the national armaments be strong or weak, America's policy abroad will continue to be guided by the same desire to preserve peace. It is well to stress this point if, as I am assured, there are people in America so ignorant of their country's history and so blind to the obvious trend of national policy as to believe that the possession of a really formidable navy would tempt their statesmen to embark on imperialistic schemes liable to provoke war.

To return now to the thesis that armaments do not insure against war: this seems to be based on the popular belief that the World War came at a period when all the major States of Europe were armed to the teeth.

But a closer investigation of the circumstances would show that neither France nor Russia was properly prepared in 1914. They were, in fact, caught napping by a vigilant and unscrupulous foe who, having made up his mind that war was essential to the furtherance of his policy, launched the bolt at his selected moment. The French Army was far below its paper establishment. The disclosures made by Senator Humbert early in 1914 showed the nominal strength of the army on mobilization to be forty per cent below the official calculation, that there was a fifty per cent deficiency in equipment and that the frontier forts on which so much reliance was placed as a bulwark against invasion were hopelessly obsolete.

All this was perfectly well known to the German general staff. They knew, also, that Russia was in no condition to wage effective war. The strategic railways which alone would have enabled Russia to concentrate her manpower in the decisive zones had not even been commenced. Germany, indeed, held most of the cards and so far as military strategy was concerned her action in declaring war was by no means so reckless a gamble as it seemed at the time. Great Britain was prepared for war by sea, and it is still a debatable question whether Germany would have broken the peace had she known positively that we should side against her.

That the reputed impotence of the American Navy and Army was one of the chief reasons that encouraged the German war leaders to launch their ruthless *U*-boat campaign has been freely admitted by them. Had the American Fleet in 1917 been half as strong again as it actually was, Germany would have hesitated to defy Washington in the matter of submarine warfare, and the United States might have been spared the necessity of taking up arms to vindicate its rights.

If any consider this statement farfetched I would refer them to the proceedings at the Reichstag committee of inquiry into the war, held in 1919, when a large number of German officers and experts testified that the risk of American intervention had been accepted because the Berlin war chiefs believed that country to be incapable of putting up a respectable fight.

Ludendorff's own words were: "America can be disregarded as a negligible factor. She has no army, and if she tries to send her handful of troops to Europe she will have no ships to defend them against our *U*-boats. America simply does not count."

Other high officers were of the same opinion, and only the Chancellor, Bethmann-Hollweg, remained dubious as to the wisdom of flouting the

United States. In the light of these facts it is surely permissible to contend that unpreparedness was largely responsible for bringing America into the war.

When a British Cabinet Minister grumbled at the cost of the navy, Lord Fisher laconically remarked that "battleships were cheaper than battles." In spite of the tremendous cost of modern naval material, that epigram still holds true. The direct and indirect expenditure entailed by a month of war would exceed the cost of building an entire fleet in peace time.

Last year the General Board of the United States Navy drew up a program of fast cruisers and long-range submarines, which would be indispensable to the fleet if it had to operate under war conditions. This program has been shelved in deference to economy, so that the navy is deprived for another year of units essential to its fighting efficiency. America's military weakness has become a favorite topic of discussion by Japanese publicists, not a few of whom use it as an argument in favor of taking stronger measures with China.

Those who follow the development of Oriental ideals are aware of the growing conviction that America will under no circumstances wage a war in defense of her Transpacific interests. It must be remembered that even the ruling classes of Japan have but a superficial knowledge of foreign countries and are quite unversed in western mentality. To them it seems incredible that America would have relinquished so much of her actual and potential power in the Pacific unless she had previously made up her mind to hold aloof from all commitments in that quarter.

This impression is not confined to Japan. It has spread to China, where the trend of events since the Washington Conference has given rise to pessimism with regard to the future of the country now that American protection, which although never definitely promised, was always counted upon, has apparently been withdrawn.

For the last two decades it has been an article of faith among the Chinese of all sections that the great republic of the west, at her own time, would step in and save them from Japanese aggression. Native students who returned from the United States did much to foster this belief by their glowing accounts of America's benevolent interest in China and her firm resolve to stand no nonsense from Japan. The process of disillusionment has been assisted by the Japanese press, which is never tired of telling China that since her western friends have left her in the lurch she must henceforth fall in with the wishes of her natural protector: viz., Japan, and leave that power to shape her political destinies.

It is useless to blink the fact that this apparent loss of American prestige in the Far East has strengthened the hands of the Japanese militarists, who point to it as a complete justification of their policy. They argue that, although the "eight-eight" naval program was never completed, it served its purpose by forcing America to abandon her plan of becoming the predominant partner in East Asia and securing the lion's share of its wealth and trade. Finding herself unable to compete with Japan's growing naval power except at a cost which she considered prohibitive, she summoned a conference to regulate sea armaments by treaty, the result of which has been to leave Japan in absolute control of the Western Pacific.

Fallacious though it be, this argument is not easy to refute, for as the Japanese are intensely materialistic in matters of foreign policy it is impossible for them to conceive of any nation sacrificing weighty interests for an ideal.

Out of all the calculable developments in the Far East there are only two which might bring war in their train. The first is an attempt by any

power to undermine Japan's political and economic ascendancy in that sphere. The second is an increase of domestic unrest in Japan to an extent that threatened to subvert the existing régime. In the latter event it would be in accordance with Japanese precedent to create a diversion abroad and so to smother incipient revolution under a tidal wave of patriotic sentiment. A convenient pretext for this could be found in America's treatment of Asiatic immigrants. In either of the cases mentioned the risk of war would be intensified if Japan's rulers felt confident of achieving a victory. On the other hand, they would be less inclined to dare the hazard of conflict with an opponent who was powerfully armed. That is one reason why peace in the East is bound up so closely with preparedness in the West.—Hector C. Bywater in *Baltimore Sun*, 20 March, 1923.

AIR SUPREMACY.—Washington, February 18.—Co-incident with the announcement of Italy's ratification of the Washington Naval Treaty, comes the publication of the proposal of the Italian government to launch the formation of a fleet of 790 airplanes, the future air force which would enable her to dominate that section of the Mediterranean and control the coming air route from Europe to the Near East.

Official circles are keenly interested over this report which is looked upon as the first open move among European countries to challenge France's supremacy in the air which for months past has been the subject of considerable agitation in the foreign press and of parliamentary discussion particularly in England and Italy.

That France now is "Queen of the Air" is an undisputed statement among American air experts who have been following the feverish activity which has marked her development of aviation since the war and particularly during the past year.

With an active Air Service consisting of 128 squadrons, a standing flying personnel of more than 3,000 aviators and a force of ground workers of more than 31,000 men, approximately twelve to fifteen hundred planes in the organization ready for instant call, France in twenty-four hours could muster an effective air force estimated at from eight to ten times the strength that England could have available in home territory.

In addition to this force which is kept in such a state of preparedness that it could be completely mobilized within thirty-six hours ready to strike, 800 pilots have been in training every year for three years past and has called back to the colors from two to three hundred pilots annually for service, which is building her up a tremendous reserve supply of fliers in case of emergency.

During 1922 the output of new planes averaged 300 machines a month, a part of which was for export but in case of war all of the 3,600 planes turned out during the year, whether for civilian or military purposes would be available. While much of the information regarding number and types the French have available for war uses is jealously guarded, as well as data as to the different types and weight of bombs they carry, it is known here and abroad that in modern types of swift combat and observation planes as well as in the latest big bombers, France is far in the lead.

That this undisputed supremacy of the air was a definite objective to be obtained by the French before undertaking to move in the Ruhr is the opinion of many military strategists here. Some of them believe that it accomplished the desired purpose and had a direct influence on England's attitude of "standing by" without strenuous protest when the move was finally made.

With her matchless air organization, these strategists point out, France not only holds the key to British naval operations in the Mediterranean but could within a few hours strike southern England and London itself with a force to which the channel and the straits are no barrier.

Open cognizance of this has been taken by the British not only in parliamentary debate but in papers of recognized standing. In a recent editorial the *Manchester Guardian* points out the "hopeless inferiority" of the British air forces which "could not be tolerated" except in the case of a "France between whom and ourself there was a mutual trust."

According to official figures the Royal Air Force in Europe, including those for the time being in the Constantinople area is approximately fifteen squadrons as against more than a hundred which the French have at home. The British squadrons, however, consist of twelve planes each while the French average from nine to ten. The total number of British active squadrons is thirty-two. The personnel force of the British in Europe consists of approximately 1,200 trained pilots, seventy-five observers and about 20,000 men needed for ground duty.

Figures on the effective air strength in the United States make an interesting comparison with those of the French force. According to the last report of the Army Air Service here there were 772 pilots and seventy-five observers on the active list and 797 observation, pursuit and bombing planes on hand ready for service with 370 of the same type contracted for and in process of construction. These figures are of course exclusive of Naval Aviation, the primary purpose of which of course is service with the fleet and defensive off shore operations, and of Marine Corps aviation.

Full recognition of the vast development of aviation abroad has been given by both the army and navy here and a comprehensive plan for systematic development of both the Air Service and Naval Aviation has been worked out. It calls for an eventual Air Service with 300 planes on each coast and 1,000 planes at points in the interior, and a naval development that will provide 300 planes to be placed on every possible ship in active service and approximately 300 planes for the two huge airplane carriers now under construction. Twenty-five hundred officers and 40,000 men is the ultimate goal the Air Service seeks and at the next session of Congress it is expected that an attempt will be made to inaugurate such a program, the plan being to extend it over a period of several years.

SALUTE AND SPEAK.—For years it has been the custom of many officers, when returning the salutes of noncommissioned staff officers and sergeants of their acquaintance, to accompany the return of salutes from these men with a word of acknowledgment or greeting when within speaking distance. It is desired to suggest that it would be worth while to extend the application of this recognized custom to the acknowledgment of salutes from all soldiers. In all our text books and Regulations which refer to the salute, emphasis is laid on the fact that this is an act of military courtesy. In the instruction of recruits never failing emphasis is laid on the time-honored significance of the salute, as a mark of recognition not only of the respect and subordination of a junior for his senior, but as well as its symbolism of the bond of comradeship which exists between all the members of the military service. When two officers meet and exchange salutes, this symbolism is fully emphasized by the well-nigh universal practice of exchanging a word of greeting at the time the salutes are rendered. Can there be any good reason for not extending this logical practice to the exchange of salutes between officers and soldiers?

It would seem that there could be but two objections to the adoption of this practice. The first might be that if officers were to greet all soldiers with a "good morning" or "good afternoon," those whom they knew personally and those whom they did not know alike, there might be opened the opportunity for unwarranted familiarity on the part of untrained and indiscriminating soldiers, and the breakdown of what is sometimes considered to be a necessary reserve in the relations between

officers and soldiers. As a bit of positive testimony to the fact that no such calamitous peril lies in wait, there may be pardoned the personal statement of the writer that for years he has followed this custom, and that while his verbal greeting has sometimes occasioned evident surprise on the part of soldiers who did not know him, yet not once in all these years has there been indicated the slightest tendency to take unwarranted advantage of this courteous practice.

The second possible objection is that if an officer felt called upon to speak to every soldier whom he passed within hearing, that the demand on his attention and vocal organs would constitute an insufferable nuisance. In answer to this objection it seems only necessary to hark back to the conception that the salute itself is considered an act of courtesy, an act which is as incumbent upon the officer for its performance as upon the soldier and that if it is not considered intolerable to require the salute as an act of courtesy, it is not intolerable to make the act one of courtesy in fact as well as in name.

From time to time one hears complaint as to the difficulty in securing compliance with the regulations concerning the salute. It is believed that the general adoption of the custom hereby suggested, would go a long way toward removing this difficulty. Again injecting an item of personal experience, the writer may state that the failure to tender him the required salute by soldiers is an extremely rare occurrence and a practically unknown occurrence in so far as soldiers who know him are concerned. Furthermore, since the change in Army Regulations has gone into effect which does not require the exchange of salutes when not on a military reservation, the writer has not in a single instance failed to receive a salute under these conditions from soldiers who know him by sight.

The value of the salute in the military service is generally recognized, and consequently the insistence on proper saluting was one of the fundamental items in the training of our huge war-time Army. There is ample evidence to show that thousands of men now in civil life who were in the Army during the War entertain a feeling of bitterness and resentment toward the salute that transcends any other unpleasant recollection of their military service. It is not unreasonable to suppose that if this custom had been generally modified to include a verbal acknowledgment on the part of officers, that the memory of the salute would have left no sting in the minds of these war veterans. Not only would this spoken word made the salute appear to them in fact an act of military courtesy, but in addition it would doubtless have had the effect of modifying the attitude of the officers themselves so that their acknowledgment of salutes would have been not merely perfunctory and palpably impersonal, but unconsciously and genuinely courteous. Real and spontaneous courtesy can never do any harm, either inside the Army or outside.—*The Coast Artillery Journal*, March, 1923.

CURRENT NAVAL AND PROFESSIONAL PAPERS

"U. S. S. *Maryland*, Description and Official Trials,"—(a very complete and interesting description of the ship and electric drive installation, with illustrations and wiring diagrams), Lieutenant Commander F. T. Van Auken, U. S. N., in the *Journal of the American Society of Naval Engineers* for February, 1923.

"The Wireless Equipment of Aircraft,"—(Direction finding, communication, etc., on the Croyden-Paris airline),—*The Engineer*, 23 February, 1923.

"Shooting Seaplanes from the Deck of a Speeding Ship,"—(an illustrated article on the various types of catapults in use in our Navy), by S. G. Roberts in the *Compressed Air Magazine*, for March, 1923.

"Scrapping Mahan,"—"the world therefore has scrapped more than battleships; it has discarded Mahan's entire philosophy for an experiment in faith"), by W. O. Stevens in *The Yale Review* for April, 1923.

Pertinent Articles in: *The Journal of the Royal Service Institution* for February, 1923:

1. "The Blockade of Germany by the Tenth Cruiser Squadron in the Atlantic" (Lecture), by Admiral Sir R. G. O. Tupper.
2. "Decoy as a Weapon in Naval Warfare," by Lieutenant G. C. Steele, R. N.

NOTES ON INTERNATIONAL AFFAIRS

FROM FEBRUARY 23 TO MARCH 23

Prepared by ALLAN WESTCOTT, Professor, U. S. Naval Academy

FRANCE IN THE RUHR

Food riots, sabotage, attacks upon French officials, and French measures of prevention and reprisal continued in the Ruhr during March. In spite of constant rumors of direct negotiations between France and Germany or mediation by other powers, no steps of this nature were made public. Events up to March 23 may be summarized:

(1) On February 25 French troops occupied the intervals separating the previously occupied zones around the bridgeheads of Mayence, Coblenz, and Cologne. This extension of the occupied zones was necessary to complete the customs line and export licensing system adopted by the French authorities.

(2) On February 28 the ban was lifted on coal exports from the Ruhr to Germany, subject to payment to the French of the forty per cent tax which Germany was supposed to have collected prior to the occupation.

(3) In the Reichstag on March 6 Premier Cuno denounced French action in the Ruhr and declared that no approaches for settlement could be made at that time, although Germany, "when the path was open would be ready for frank discussion as an equal government." This attitude was approved by the Reichstag and the press, but it was reported that Ruhr industrial magnates were pressing the government to open negotiations.

(4) On March 10 two French officials were murdered in the town of Buer, and during rioting after the arrest of German suspects eight Germans were killed and thirteen wounded.

(5) At the Brussels Conference between the French and Belgian premiers on March 12 it was decided that there should be no discussion or negotiations with Germany or terms for withdrawal from the Ruhr, until full execution by Germany of reparations obligations. Accord was reached regarding measures to be taken in the Ruhr, although during the discussion the Belgian delegates were more inclined toward efforts to come to terms with Germany, providing not only for reparations but also for security, in view of Anglo-American refusal to ratify the guarantee treaties proposed at Versailles.

(6) On March 16 the German ambassador in Washington handed to Secretary Hughes a memorandum stating the German position regarding reparations and the Ruhr situation. This memorandum was placed on

the confidential file, and, although consent was given by Berlin, its contents were not communicated to the French or other governments.

FRANCE

FRENCH VIEW OF NAVAL TREATIES.—Paris, March 21 (Associated Press)—Deputy Charles Guernier, the official reporter on the Washington naval treaty, today made his long-deferred report to the Foreign Affairs Committee of the Chamber of Deputies. While his conclusions were favorable to ratification by France, his exceptions and reservations were such that a majority of the committee thought it necessary to give Aristide Briand and René Viviani, the former of whom headed the French delegation to the Washington Conference, a chance to be heard before the committee made its recommendations.

M. Guernier's exceptions and reservations were twofold. The first was that France would be bound for too long a period of time by the agreement, and the second that the allotment of tonnage was out of proportion to the country's needs regarding the safety of the seaboard of the mother country and of the colonies. M. Guernier argued that M. Briand and Viviani had failed to safeguard the best interests of France and Japan had treated her as "a poor country cousin."

RUSSIA

NO AMERICAN RECOGNITION.—Washington, March 21.—Not until the Soviet Government of Russia sees fit to abandon policies that involve repudiation of international obligations, confiscation of private property and visitation upon other peoples of the world of "the disasters that have overwhelmed the Russian people" will the Government of the United States consider extending recognition to that Government, according to the policy outlined in a notable speech which Secretary Hughes made today to a delegation of women representing the Women's International League for Peace and Freedom.

The fundamental test, so far as recognition was involved, Secretary Hughes declared, was the evidence of a Government's ability and disposition to discharge international obligations, and in this connection, he pointed out, the United States had loaned the Kerensky régime about \$187,000,000, yet in January, 1921, the present Government of Russia, the Secretary said, "unconditionally and without any exceptions" annulled the foreign debt of Russia. He added:

"Not only would it be a mistaken policy to give encouragement to repudiation and confiscation, but it is also important to remember that there should be no encouragement to those efforts of the Soviet authorities to visit upon other peoples the disasters that have overwhelmed the Russian people."

The Secretary told the delegation he wished he could believe that such efforts had been abandoned. But not later than November, he told them, Zinoviev had solemnly declared that "the eternal in the Russian revolution is the fact that it is the beginning of the world revolution," while in October Trotzky, addressing the Russian Communist youths, assured them that the revolution was coming in Europe and in America, and that when it did come it would be "long protracted, cruel and sanguinary."

TURKEY AND NEAR EAST

ALLIES DISCUSS TURKISH REPLY.—After adverse action regarding the Lausanne Treaty by the Angora parliament, Turkey prepared a document

proposing numerous eliminations, additions, and changes in the treaty. The proposed changes related chiefly to the treatment of foreigners in Turkey, and the distribution of the Turkish debt among provinces detached after the war. No changes were made in the articles relating to the Straits, and it was felt that the counter-proposals in general offered no dangerous obstacles to a final settlement.

During the week of March 18-24 French, British, and Italian representatives met in London to define the attitude of the Allies regarding the counter-proposals and settle time and place for further negotiations.

FAR EAST

CHINA PROPOSES ABROGATION OF "TWENTY-ONE DEMANDS" TREATY.—On March 10 the Chinese Government sent a note to Japan suggesting that a date be set for discussion of the return to China of Dalny and Port Arthur (the twenty-five-year lease of which expires in the near future) and the abrogation of the 1915 treaties between China and Japan embodying some of the famous "twenty-one demands." This move on the part of China was regarded as little more than a maneuver in the approaching Chinese presidential elections. Japan replied rejecting the Chinese proposal.

It was pointed out that "Group I" of the "twenty-one demands" was eliminated by the return of Shantung. Groups II, III, and IV provide for an extension of the Japanese lease in Port Arthur and economic privileges in Southern Manchuria and Eastern Inner Mongolia.

UNITED STATES AND LATIN AMERICA

SETTLEMENT OF RHINE ARMY CLAIMS.—During March negotiations were conducted in Paris between Eliot Wadsworth, representing the U. S. Treasury Department, and Allied officials to settle the method of payment for the American Army of Occupation in Germany. As finally proposed and accepted in principle by the Washington Government, the settlement reached provided that the American claims be paid in twelve annual installments out of future cash deliveries by Germany.

The American claims amount to about \$255,000,000, or 1,000,000,000 gold marks, which would call for twelve payments of about 80,000,000 gold marks. The United States rejected the proposal that the value of German ships seized by the United States during the war, amounting to perhaps \$20,000,000, should be deducted from the total claims.

PROPOSAL TO JOIN WORLD COURT.—On February 24 President Harding sent the following message to the Senate, urging consent to adhesion by the United States to the protocol establishing the Permanent Court of International Justice:

To the Senate:

There has been established at The Hague a Permanent Court of International Justice for the trial and decision of international causes by

judicial methods, now effective through the ratification by the signatory powers of a special protocol. It is organized and functioning. The United States is a competent suitor in the court through provision of the statute creating it, but that relation is not sufficient for a nation long committed to the peaceful settlement of international controversies. Indeed, our nation had a conspicuous place in the advocacy of such an agency of peace and international adjustment, and our deliberate public opinion of today is overwhelmingly in favor of our full participation, and the attending obligations of maintenance and the furtherance of its prestige. It is for this reason that I am now asking for the consent of the Senate to our adhesion to the protocol.

With this request I am sending to the Senate a copy of the letter addressed to me by the Secretary of State in which he presents in detail the history of the establishment of the court, takes note of the objection to our adherence because of the court's organization under the auspices of the League of Nations, and its relation thereto, and indicates how, with certain reservations, we may fully adhere and participate and remain wholly free from any legal relation to the League or assumption of obligation under the covenant of the League.

I forbear repeating the presentation made by the Secretary of State, but there is one phase of the matter not covered in his letter with which I choose frankly to acquaint the Senate. For a long period, indeed ever since the international conference on the limitation of armament, the consideration of plans under which we might adhere to the protocol has been under way. We were unwilling to adhere unless we could participate in the selection of the judges; we could not hope to participate with an American accord if adherence involved any legal relation to the League. These conditions, there is good reason to believe, will be acceptable to the signatory powers, though nothing definitely can be done until the United States tenders adhesion with these reservations. Manifestly the Executive cannot make this tender until the Senate has spoken its approval. Therefore I must earnestly urge your favorable advice and consent. I would rejoice if some action could be taken even in the short period which remains of the present session.

It is not a new problem in international relationship; it is wholly a question of accepting an established institution of high character, and making effective all the fine things which have been said by us in favor of such an agency of advanced civilization. It would be well worth the while of the Senate to make such special effort as is becoming to record its approval. Such action would add to our own consciousness of participation in the fortunate advancement of international relationship and remind the world anew that we are ready for our proper part in furthering peace and adding to stability in world affairs.

The President's message was referred to the Senate Committee on Foreign Affairs. In reply to a request from the Committee, Secretary Hughes on March 2 supplied further information, but in view of the limited time before the adjournment of Congress the Committee did not take action. A resolution to take up the matter, offered by Senator King in the Senate on March 3, failed by a vote of 49 to 24.

PAN-AMERICAN CONFERENCE.—The Fifth Pan-American Conference was scheduled to assemble at Santiago, Chile, on March 25, with delegates

from all American republics except Mexico, Peru, and Bolivia. Among topics on the agenda may be noted the following:

Under topic XVI, Uruguay will propose that all the American countries adopt, as a principle of their foreign relations, that an encroachment upon the rights of any one of them, inflicted by a non-American power, must be considered an encroachment upon the rights of all, and should call for a uniform policy from all. It was under this doctrine, called in South America the *Brum Doctrine*, that Uruguay broke its relations with Germany upon the entrance of the United States into the World War.

The reduction of armaments proposed by Chile under topic XII is expected to be the most important and practical of the matters to be discussed, the success of which depends, principally, upon an agreement among Argentina, Brazil and Chile, the three leading naval and military powers of South America. The United States already having reduced its armed force to the minimum under the Five Powers Agreement of 1921, the present navy and army of this country will not be affected.

Of the nineteen points of the agenda, the United States proposes ten, seeking to bring about a co-ordinated plan or commercial agreements among the twenty-one American Republics. Prohibition is brought up by Venezuela, under the form of a progressive diminution of the production of alcoholic beverages.

The United States will be represented at the conference by a delegation headed by Henry P. Fletcher, Ambassador to Belgium, and including Senator Kellogg of Minnesota, Senator Pomerene of Ohio, former Senator Saulsbury of Delaware, George E. Vincent, President of the Rockefeller Foundation, New York; Frank C. Partridge of Vermont, William Eric Fowler of Washington and Dr. L. S. Rowe, Director of the Pan-American Union.

BRAZIL REJECTS NAVAL LIMITATIONS.—Brazil goes to the Pan-American Conference at Santiago opposed to accepting any plan for reducing or limiting armament expenditures which would deprive her of an adequate protection for her coast and coastwise communications.

Afronio de Mello Franco, head of the Brazilian delegation said it was correct to infer that this attitude implied Brazil's unwillingness to accept the original suggestion of Chile that armament expenditures be limited or reduced in equal proportions, and also that Brazil was not willing to accept limitation of armaments to the status quo in South America.

"I believe that Argentina, Brazil and Chile—the three nations most interested—have the same pacific ideals," he asserted, "and are thoroughly in sympathy with the idea of lifting the burden of armament expenditures. But in approaching this question it is necessary for Brazil to take into consideration her national necessities, which primarily are those imposed by geography.

"These consist above all in protecting our coastwise communications, which are absolutely essential to preserving the unity of the republic. It must be remembered that Brazil possesses enormous stretches of territory and, unlike Argentina and less so than Chile, Brazil has not a railroad system which connects all parts of the country, especially in the north. Sea communications are the only means of reaching these isolated sections.

"For example, in the case of a seditious movement occurring in the State of Bahia some time ago, the only way the Government could send forces to put it down was by sea. The lack of rail communication consequently makes sea communication and its protection vital necessities of the national unity and welfare.

"War in South America is inconceivable, and it is the furthest from the thought of the Brazilian people and Government to seek hegemony in South America through naval power. All that we want is the adequate protection I have mentioned. As long as we are assured of this we are willing that Argentina and Chile should have such navies as they please; but reduction or limitation in equal proportion, or even preservation of the status quo, will not assure this because of the fact that Brazil's navy at present stands third in South America and we would be limited by these propositions in providing for our necessities.

"We have the fullest confidence that the discussion at Santiago, to which we are going in the friendliest spirit, will lead to an amicable understanding."

REVIEW OF BOOKS

LA GUERRA MARITTIMA (with the subtitle, "A Study of the Employment of Means in the World War") Vol. I. By Romeo Bernotti, Capitano di Vascello. Florence, Italy, 1923.

A REVIEW BY PROFESSOR ALLAN WESTCOTT, U. S. NAVAL ACADEMY

The author of this study is Director of the Italian Naval War College, and a writer of recognized international authority. A translation of his earlier work on *Fundamentals of Naval Tactics* was published by the Naval Institute, and in 1920 appeared his valuable historical narrative entitled *Il Potere Marittimo nella Grande Guerra*.

As compared with the volume just mentioned, the present work is entirely different in treatment. Nothing quite like it, so far as the reviewer is aware, has been attempted in English. Indeed it is no dispraise of the book to say that for American and English readers it is even more valuable as an example of logical and systematic method applied to the study of naval problems, than it is for the actual conclusions reached. We may have reached similar or possibly better conclusions, but we have probably reached them in more haphazard and less convincing ways.

To quote the preface, the purpose is to seek the new principles and lessons to be derived from the war. The method consists in "an appreciation of the extent of evolution from pre-war ideas to those adopted in the course of the war, and then a projection of these lines of evolution into the future." The book is not a story of what happened, but an attempt at generalization or synthetic study of principles and methods employed. The first part of the book deals with the situation before the war—geographic and economic conditions affecting the future belligerents, naval policies, events leading up to the war, naval doctrines in general acceptance, the make-up and disposition of naval forces. The second part contains three chapters covering less familiar ground—(1) naval plans and their application or modification in the actual conduct of the war; (2) the strategic heritage from the war, and (3) new strategic possibilities. A second volume will deal with tactics, combined operations, and new lines of national policy relating to maritime affairs.

Some of the conclusions in the chapter on *The Strategic Heritage from the War* may be briefly indicated. (1) Since, on account of submarines and aircraft, "control" or "domination" of the sea has become more difficult than in the past, it is well to draw a distinction between "free use of the sea" and "control of the sea," the latter signifying not merely free use but guaranteed ability to pursue one's own objectives and effectually

to prevent the enemy from doing the same. Neither side had either free use or control in the eastern Atlantic or Mediterranean at the height of the submarine campaign in 1917. (2) In view of the increased employment of "insidious" methods of warfare, the evolution of naval strategy has been away from the concept of close blockade to that of mutual "vigilance," with increased strategic possibilities to the weaker fleet. On the other hand, better means of communication have reduced the difficulties of insuring contact and determining enemy objectives, and have placed increased weight on efficient information service. Essential means of insuring contact include radio-equipped submarines in the vicinity of enemy bases and along his presumable line of operations, aircraft of all types and aircraft-carriers, light cruisers, and battle cruisers able not only to establish but maintain contact with the enemy main force. (3) The question of bases is discussed, with emphasis on the necessity of a well prepared *system* of advanced and permanent bases, located in the best possible adjustment of the conflicting principles of protection against attack and convenience for one's own offensive operations. Incidentally, as an instance of the value of access to German sources,¹ it is noted that the *Göben*, though credited with better speed than any of the British battle cruisers in the Mediterranean, was in reality prevented by the bad condition of her boiler tubes from making better than eighteen knots (except for a brief spurt on August 4). Hence the obvious rule that it is never wise to assume the impossibility of pursuit *a priori*, on the basis of known data, without an actual trial.

The final chapter on *New Strategic Possibilities* deals primarily with submarines, gas, and especially aircraft. It is pointed out that aerial development has further increased the possibilities of offensive operations on the part of the weaker belligerent, and that the country with sea frontiers, instead of being protected, is the more exposed to surprise aerial attack. As regards the question whether aircraft have rendered battleships obsolete, it is held axiomatic that a new means of warfare, however dangerous it may render the employment of an old one, cannot condemn it entirely, provided it has a function of essentially different character. Torpedoes, mines, and submarines did not condemn the battleship. Aircraft and submarines, however effective for scouting and combat, cannot in their present or even prospective development accomplish the transportation overseas of great masses of men, munitions and supplies. So far as we can envisage the future, surface navigation will remain an important and necessary factor in peace and war.

Nevertheless, in view of the increased possibilities of aerial offensive, the nation that neglects this arm runs the risk of initial loss of control of the air and consequent quick defeat. Aerial defensive strategy calls for an energetic counter-offensive against enemy forces and bases, and a strength at least equal to that of the enemy. "From a maritime point of

¹From an article by Admiral Souchon in a German collection entitled "Undeclared on the Sea."

view, control of the air is an integral element in control of the sea; it should be such as to prevent free use of the sea and adequate security of naval bases against aerial attack."

As regards the general form of future naval warfare, "initial condition of preparation is likely to have a decidedly greater significance than in the past; it can be shown that a brief period may decide the fate of a nation that in peace has not sufficiently appreciated new military possibilities. . . . It is essential that each nation, on the basis of its geographic and economic situation, determine the minimum preparation required in order to prevent the rapid annulment of its powers of resistance. This minimum is absolutely necessary, and must not be sacrificed because of financial exigencies, or because of the nation's pacific policies in international affairs, for without such minimum the nation cannot command respect."

The brief extracts from Captain Bernotti's book which are here given make no pretense of adequate summary, but are intended rather to illustrate the general character of the conclusions reached. Often, it will be seen, they have special reference to Italy and are less applicable to nations more distant from possible enemies. But they have all the value that must attach to sober conclusions reached on the basis of a thorough survey of the data at hand.

U. S. NAVAL INSTITUTE

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Discussions Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at approximately one-half the rate for original articles.

Index The index of the PROCEEDINGS for Volume 48 (1922) is now ready for issue. A copy will be mailed to members and subscribers on request.

Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication. In accepting articles for publication, the Institute reserves the right to have such articles revised or rearranged, where necessary, in order to bring them up to the required standard of articles published in the PROCEEDINGS—the cost, if any, to be deducted from the compensation due the author.

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H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE, 1924

A prize of two hundred dollars, with a gold medal and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original article on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the article.

On the opposite page are given suggested topics. Articles are not limited to these topics and no additional weight will be given an article in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original articles published in the PROCEEDINGS during 1923 shall be eligible for consideration for the prize.

2. No article received after October 1 will be available for publication in 1923. Articles received subsequent to October 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best article published during 1923 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more articles receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. The method adopted by the Board of Control in selecting the Prize Essay is as follows:

(a) Prior to the January meeting of the Board of Control each member will submit to the Secretary and Treasurer a list of the articles published during the year which, in the opinion of that member, are worthy of consideration for prize. From this a summarized list will be prepared giving titles, names of authors, and number of original lists on which each article appeared.

(b) At the January meeting of the Board of Control this summary will, by discussion, be narrowed down to a second list of not more than ten articles.

(c) Prior to the February meeting of the Board of Control, each member will submit his choice of five articles from the list of ten. These will be summarized as before.

(d) At the February meeting of the Board of Control this final summary will be considered. The Board will then decide by vote which articles shall finally be considered for prize and shall then proceed to determine the relative order of merit.

6. It is requested that all articles be submitted typewritten and in duplicate; articles submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

H. G. S. WALLACE,

Commander, U. S. Navy, Secretary and Treasurer.

SUGGESTED TOPICS FOR ARTICLES

- Aviation—Its Present Status and Probable Influence on Strategy and Tactics.
The Anti-Aircraft Problem from the Navy's Viewpoint.
Co-ordination of the Naval Air Force with Other Naval Forces.
Naval Bases, Their Number, Location, and Equipment.
Military Character.
The Relation of Naval Communication to Naval Strategy.
Proportion of National Budget Which Should be Devoted to Naval Expenditures.
The Necessity for Having a Fleet.
Organization of Fleet for War.
The Offensive and Defensive in Gas Warfare.
The Best Protection from Gas Attack.
Naval Gunnery of Today, the Problems of Long Range and Indirect Fire.
Physical Factors in Efficiency.
The Relation between the Navy and the Merchant Marine.
America as a Maritime Nation.
Relation of the Medical Department to a Plans Division.
The Place of Mines in Future Naval Warfare.
A Mobilization Program for the Future.
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The Mission of the Naval Academy in the Molding of Character.
How to Best Educate and Convert the American People to the Need of a Strong National Defense.
The Navy in Battle; Operations of Air, Surface, and Underwater Craft.
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The Naval Officer as a Diplomat.
Is the Present System of Training and Education for Officers Satisfactory and Sufficient?
The Role of the Navy at Peace.
Training Naval Personnel During the Next Ten Years.
Six Years of Promotion by Selection in U. S. Navy. Its Effect Upon Discipline and Morale.
The Employment of Retired Officers Separated from the Service by Reason of the Age in Grade Feature of the Existing Selection Law.
What Measures Should be Adopted to Create and Maintain a Balanced Enlisted Personnel of 120,000 Men?
Our Future Naval Policy Based on Existing International Treaties.
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Shore Duty for Enlisted Men.
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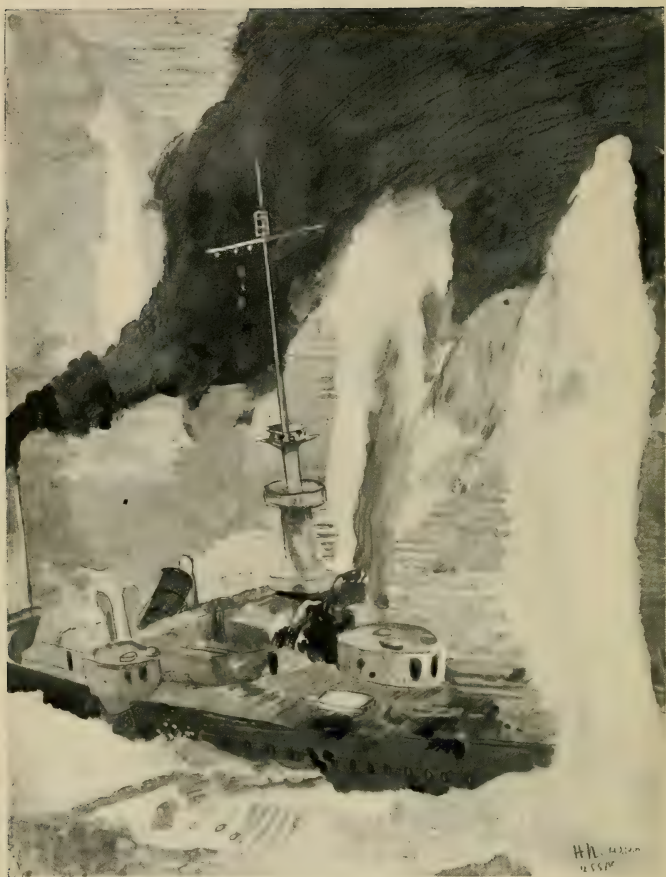
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THE SINKING OF THE IOWA

As seen from the U. S. S. Mississippi

Drawing by Lieutenant Commander Henry Reuterdaahl, U. S. N. R. F.

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WHOLE No. 244

LAWS AND CUSTOMS OF WAR AT SEA AS AFFECTED BY THE WORLD WAR

BY REAR ADMIRAL RICHARD WAINWRIGHT, U. S. NAVY, RETIRED

PRIOR to the advent of the World War there was an attempt to agree upon the laws to govern maritime warfare, so as to have a body of laws for the guidance of an international prize court, recommended by the Second Hague Conference. The Declaration of London was the result. Great Britain failed to ratify the Declaration of London although it was only after some energetic protest from her naval officers that the ratification was refused. Similar protests from American naval officers failed to prevent ratification by the United States.

After war was declared the Allies agreed to accept the Declaration of London as a guide, with certain omissions and modifications. In agreement with her Allies several Orders in Council were issued by Great Britain making further modifications, and finally under date of July 7th, 1916, Great Britain by Order in Council formally withdrew all adhesion to the Declaration of London and expressed the intention, "to exercise their belligerent rights at sea in strict accordance with the law of nations." That necessity knows no law, may not with justice be strictly applied to their conduct of maritime warfare; but that necessity did require many twists and turns to the laws and customs prevailing before the World War, can hardly be denied. The Germans disregarded both laws of war and those of humanity.

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The Allies, under the claim of necessity, seriously encroached on the rights of neutrals.

The laws of war at sea have gradually led to the restriction of neutral maritime rights. The list of contraband articles, commencing at munitions of war, has gradually increased until (as extended during the World War) it includes nearly every article of commerce. Conditional contraband, which was recognized by the Declaration of London and was immune from the doctrine of continuous voyage, was denied this right by the Allies.

The restriction of neutral rights by the law of continuous voyage was largely extended by the Union courts during our Civil War. If the ultimate destination was enemy country the capture was justified; but during the World War, although the goods might be destined to form part of the common stock of the neutral, the capture of a belligerent was allowed if the receiving neutral exported such goods to a rival belligerent; and the penalty attached to the neutral goods, although they were proved to be innocent of enemy destination.

The right of search was definitely determined by the custom of maritime nations prior to the World War, to be the right of search of ships, papers, and cargo at sea, and care was exercised to make the delay to innocent neutral commerce the minimum possible; and redress was given by belligerent courts where vessels or goods were captured without probable cause. During the World War the right of search was extended to include the right of detention. Neutral vessels were taken into belligerent ports for search. Some were released in a few days, without compensation for delay; some had all or a portion of their cargoes discharged. Some were required to pay port dues, unloading charges, etc., and to sign releases of all claims for damages due to delay. Some were held for months, to obtain further evidence, and some to force embargo orders from the neutral government of the port of destination.

The procedure of our prize courts was adopted largely from that of the British. One most equitable rule of the courts was in the first instance to examine the papers, etc., of the vessel seized, and if probable cause was not found, the vessel or goods were released at once, thus saving the costs of long trial and reducing the time of the interruption of neutral trade. The World

War changed the procedure of British courts, and the whole question was opened in the trial. Also the burden of proof was placed on the neutral, in many cases, thus increasing the delay and costs at the expense of the neutral.

The question of blockade both against military and commercial ports also had been fairly well settled. There were some differences between our practice and that of the continental powers. The Declaration of London made the requirements of notice, etc., rather severe for belligerents; but there was no doubt about the right to blockade neutral ports,—that was prohibited. Yet during the World War the right of the Allies to detain all commerce on its way to or from enemy countries, by a direct route or through neutral countries, was proclaimed. In this no distinction between contraband and innocent goods was made, and it was claimed that all goods afloat that might in any manner reach the enemy were lawful prize. Neutral ships and neutral goods were safe within neutral ports, and within the three-mile limit of neutral coasts; in the open sea, they were liable to be seized by the belligerents.

CONTRABAND

The list of contraband of war has been steadily enlarging. In the Fourth Commission of the Second Hague Conference, Great Britain proposed to abolish contraband entirely. Among others this was opposed by the United States and France. In a sub-committee an agreement was finally reached as to absolute contraband; but our technical delegate refused to consider the question of conditional contraband. In the conference the matter of contraband was postponed for further consideration. In 1904 our Secretary of State, John Hay, writes to the American Ambassador at St. Petersburg (Dept. of State No. 143) :

Articles which, like arms and ammunition, are by their nature of self-evident warlike use are contraband of war if destined to enemy territory; but articles which, like coal, cotton and provision, though ordinarily innocent, are capable of warlike use, are not subject to capture and confiscation unless shown by evidence to be actually destined for the military or naval forces of a belligerent.

The established principle of discrimination between contraband and non-contraband goods admits of no relaxation or refinement. It must be inflexibly adhered to or abandoned by all nations. There is and can be no

middle ground. The criterion of warlike usefulness and destination has been adopted by the common consent of civilized nations after centuries of struggle in which each belligerent made indiscriminate warfare upon all commerce of all neutral States with the people of the other belligerent, and which led to reprisals as the mildest available remedy.

In the Declaration of London is a list of absolute contraband articles, one of conditional contraband, and one of articles not to be declared contraband. On this latter list will be found raw cotton and rubber. Food is in the conditional contraband list.

Conditional contraband is liable to capture if it is shown that it is destined for the use of the armed forces or of a government department of the enemy State (Article 33).

The doctrine of continuous voyage is excluded from conditional contraband.

The ship's papers are complete proof of the voyage of a vessel transporting absolute contraband, unless the vessel is encountered having deviated from the route which she ought to follow according to the ship's papers and being unable to justify by sufficient reason such deviation. (Article 32)

The World War was prosecuted with such intensity that the efforts of all the inhabitants of the belligerent nations were concentrated upon running the war; making food products takes a most important place in the conduct of the war. Also many new instruments of war, and the extension of the use of older instruments, made many articles on the conditional and prohibitive list, of great importance to the belligerents; and the improvement in methods of transportation made delivery in any portion of a belligerent's territory equivalent to a delivery to his military forces. It soon became evident to the allied countries that it was important to their interests that the list of absolute contraband be extended. This was done gradually, first by extending the doctrine of continuous voyage to the conditional contraband list, and then by adding articles that under the Declaration of London were not to be declared contraband. Finally it was announced that the Declaration of London would no longer bind the belligerents and virtually all trade with the enemy became contraband; and, through the application of the doctrine of continuous voyage, all neutral trade with the enemy was stopped, and all our trade with neutrals, such as the Scandinavian countries

and Italy (while still a neutral), was interrupted. While not deliberately announced as a blockade by the Allies, there was virtually a military blockade, and a very efficient one, against all enemy country, and a pacific blockade against the neutrals above mentioned. The course of our foreign trade was entirely directed by Great Britain, with some little assistance from France. The following shows the very broad view of the right of belligerents as to blockades, held by the British Government.

The measures taken by the Allies are aimed at preventing commodities of any kind from reaching or leaving German ports.

Due notice has been given by the Allies of the measures they have taken, and goods which were shipped or contracted for before the announcement of the intention of the Allies to detain all commerce on its way to or from the enemy countries have been treated with great liberality. The objects with which the usual declaration and notification of blockade are issued have therefore been fully achieved.

Contrast these statements with Hay's instructions to our Ambassador at St. Petersburg, quoted above,

The established principle of discrimination between contraband goods admits of no relaxation or refinement.

The British Government held that the conditions of the World War made it lawful to take measures that were aimed at preventing commodities of any kind from reaching or leaving Germany. Remembering that this meant through neutral countries as well as directly to Germany, it will be seen that all trading with the enemy, directly or indirectly, became contraband.

THE RIGHT OF VISIT AND SEARCH

In 1799 Sir William Scott announced, "that the right of visiting and searching merchant ships upon the high seas, whatever be the ships, whatever be the cargoes, whatever be the destination, is an incontestable right of the lawfully commissioned cruisers of a belligerent nation." During our Civil War Gideon Welles, Secretary of the Navy, issued very complete instructions on this subject to all flag officers. In the third paragraph he says,

That when that visit is made the vessel is not then to be seized without a search carefully made so far as to render it reasonable to believe that she is engaged in carrying contraband of war for or to the insur-

gents and to their ports directly or indirectly by transshipment, or otherwise violating the blockades.

The regulations relating to capture at sea, issued by the Japanese in 1904, contained the following article:

In visiting or searching a vessel the captain of the man-of-war shall take care not to divert her from her original course more than necessary and as far as possible not to give her inconvenience.

The following articles were in the British Regulations:

Visit, search, and detention must be exercised in accordance with the established course of procedure.

When a vessel has been detained she should be sent, with the accustomed precautions, to a Port of Adjudication; and upon her arrival there proceedings should be commenced with a view to her being duly condemned by a Prize Court.

If a Commander in the exercise of these powers detain a vessel without probable cause, or do an act not sanctioned by international law, or otherwise unwarrantable, he will incur the displeasure of Her Majesty's Government, and will also be personally liable for damages.

The Declaration of London, Article 64, is as follows:

If the capture of a vessel or of goods is not upheld by the prize court or if without being brought to judgment the prize is released, the parties interested have the right to compensation, unless there were sufficient reasons for capturing the vessel or goods.

The World War caused an expansion of the right of visit and search to one of detention for the purposes of search. The British claim was that it was impossible to conduct a real search at sea under modern conditions, and in this claim were supported by their naval officers, who as experts were called upon for their opinion. Our experts claimed that there was not sufficient change in conditions since the old rule was established to justify a change in procedure. There is no doubt that it is impracticable thoroughly to search a modern vessel at sea. This has been true for many years, and it is an undoubted fact that valuable contraband could be readily concealed so that it would be discovered only after discharging cargo and a thorough search. Neutral vessels were taken into Kirkwall and other ports convenient for the belligerents, and there examined. At first the detention of neutral vessels in belligerent ports was for the search of cargo and papers; but as the contraband list was extended,

many vessels were so detained, when they were well known to hold contraband, and to be destined to neutral ports. There was no necessity for search, and no prize proceedings were attempted. Examples of this will be given in the discussion of the rule of continuous voyage. The only complete answer to the objections raised by the authorities of the United States, to these acts made by the British Government, is in the phrase already quoted, "The measures taken by the Allies are aimed at preventing commodities of any kind from reaching or leaving Germany. . . ."

CONTINUOUS VOYAGE

The doctrine of "continuous voyage" was extended during our Civil War under the same pressure of necessity, and the same reliance on the fundamental rights of belligerents, as actuated the Allies during the World War. It was decided by our courts that the final destination of the contraband was the deciding point and that condemnation was justified, if it was intended to complete the voyage to an enemy port by transshipment in a neutral port to another vessel, as in the *Bermuda* case, or to an enemy country by rail or other land transportation, as in the *Peterhoff* case. The deciding point at this time was the question, were the goods destined for the "common stock" of the neutral or were they intended for the enemy?

In the case of the *Stephen Hart*, Judge Betts said:

If she was in fact a neutral vessel and if her cargo, although contraband of war, was being carried from an English port to Cardenas for the general purpose of trade and commerce at Cardenas, and for use or sale at Cardenas, without any actual destination of the cargo, prior to the time of capture, to the use and aid of the enemy, then most certainly both the vessel and her cargo were free from liability of capture.

In the *Bermuda* case the Supreme Court said:

We agree to this. Neutrals might convey in neutral ships, from one neutral port to another, any goods, whether contraband of war or not, if intended for actual delivery at the port of destination and to become part of the common stock of the country or of the port.

In the case of the *Peterhoff* the Supreme Court said:

It is true that even these goods if really intended for sale in the market of Matamoras, would be free from liability; for contraband may be trans-

ported by neutrals to a neutral port, if intended to make part of its general stock in trade. But there is nothing in the case which tends to convince us that such was their real destination, while all the circumstances indicate that these articles, at least, were destined for the use of the rebel forces then occupying Brownsville, and other places in the vicinity.

Under former rules of war the vessel and cargo would be liable to capture when bound directly for the blockaded port but under our Civil War decisions the vessel and cargo were liable to capture if the ultimate destination was to a blockaded port or to enemy forces. Of course these decisions were severely criticized after our Civil War. Walker says:

This decision, it is very evident, materially extends the risks of the neutral trader in the interests of the belligerent.

And Hall says:

The American decisions have been universally reprobated outside the United States, and would probably now find no defenders in their own country.

Sir Robert Phillimore says:

It seems to me after much consideration, difficult to support the decision of the majority of the Supreme Court of the United States in the case of the *Springbok*, that a cargo shipped for a neutral port can be condemned on the ground that it was intended to tranship it at that port and forward it by another vessel to a blockaded port.

The British Admiralty Manual of Naval Prize Law, 1888, shows a partial acceptance of our Civil War doctrine.

The ostensible destination of the vessel is sometimes a neutral port, while she is in reality intended, after touching and even colorably delivering over her cargo there, to proceed with the same cargo to an enemy port. In such a case the voyage is held to be "continuous" and the destination is held to be hostile throughout.

On the other hand, if the destination of the vessel be neutral, then the destination of the goods on board should be considered neutral, notwithstanding it may appear from the papers or otherwise that the goods themselves have an ulterior hostile destination, to be attained by transshipment, overland conveyance, or otherwise.

In 1900, during the Boer War, the German Ambassador at London declared it to be the opinion of his Government that prize proceedings in the case of the *Bundersrath* were not justified, for the reason that, no matter what may have been on

board, "there could have been no contraband of war, since, according to recognized principles of international law, there cannot be contraband of war in trade between neutral points."

Lord Salisbury replied that the rules heretofore adopted were "quite inapplicable to the case which has now arisen of war with an inland state, whose only communication with the sea is over a few miles of railway to a neutral port." He also quoted Bluntschli as sustaining his view of the case:

If the ships or goods are sent to the destination of a neutral port only the better to come to the aid of the enemy, there will be contraband of war and confiscation will be justified.

Up to the time of the World War it seems to have been the accepted doctrine in Great Britain and the United States that goods shipped from one neutral port to another and intended for the "general stock" of the receiving neutral were not liable to confiscation. International law authorities of Continental Europe never accepted these extensions of the doctrine of "continuous voyage," but in the Declaration of London it was accepted for absolute contraband.

Article 30. Absolute contraband is liable to capture if it is shown to be destined to the territory belonging to or occupied by the enemy or to the armed forces of the enemy. It is immaterial whether the carriage of the goods is direct or entails either transshipment (Case of *Bermuda*) or transport overland. (Case of *Peterhoff*.)

Under the Declaration of London the doctrine of "continuous voyage" did not hold in the case of conditional contraband.

However, this doctrine was further extended as will be shown in the following quotations:

The steamer *Seguranca*, which carried a general cargo from New York to the Netherlands, was detained at a great loss to the owners of the vessel and to the shippers in a British port for the greater part of last April (1915) in order that her cargo might be reconsigned to the Netherlands Oversea Trust.

In this case vessel and goods were held, although the goods were intended for the "general stock" until they were secured from leaving the Netherlands and being transported to Germany.

The steamers *Christian Knudsen* and *Platura*, carrying oil from New York to Denmark, were detained by the British authorities last fall, taken into British ports, and held until the British Government, as they

stated, could make an investigation as to the destination of the cargo. Furthermore, this Government was informed that the vessels had been detained pending the receipt of guarantees from Denmark against the exportation of the cargoes, and that the orders were given for the release of the vessel on the receipt of satisfactory guarantees.

Here the cargo was held, not because of evidence of enemy destination was found on the vessel, but to await a further search for evidence; and also because Denmark's need for oil would force her to guarantee against re-exportation.

The British authorities have repeatedly seized articles classified as contraband, articles classified as conditional contraband, as well as noncontraband goods, shipped to Scandinavian countries, to the Netherlands, and to Italy, then neutral, although the re-exportation of such commodities from these countries had been forbidden.

In December last the steamer *Tellus* was ordered to discharge a shipment of copper shipped from New York directly to a consignee in Milano, Italy, although by an Italian decree of November 13, 1914, the exportation of goods shipped in this manner was forbidden.

The steamer *Leelanaw*, which carried a cargo of cotton from Galveston to Gothenburg for transshipment to Moscow, was detained in a British port early in June last. Relative to the detention of this vessel the British Foreign Office said: "In view of the fact that cotton has now been placed on the Swedish prohibition of export list His Majesty's Government have not considered it advisable to allow this large cargo to go on to Gothenburg until they are assured that there is a fair chance of it reaching its declared ultimate destination." After nearly a month's detention the vessel was released on the understanding that she should proceed directly to Archangel.

In the cases of the *Tellus* and *Leelanaw*, although the ultimate destination was evidently not the enemy, the goods were held for fear they might in some way aid the enemy. The vessels and goods were not brought into court for condemnation and the owners were thus deprived of the usual means of obtaining damages. See also the following case:

The steamer *Wico* was held by the British authorities last March (1915). This Government was advised that the British Minister at Stockholm has informed the Swedish Foreign Office that the vessel had arrived in a British port with a full cargo of oil for a concern in Stockholm, and that, in view of the recent seizure by a German man-of-war of the steamship *Bryssel* and her cargo, the British Government required complete assurances from the Swedish Government, before the *Wico* could be allowed to proceed to destination, that she would not share the fate of the *Bryssel*.

Our frequent protests to these apparent irregularities in restraint of our right of trade as a neutral received the following reply:

It would seem to be a fair reply to such a contention that new devices for despatching goods to the enemy must be met by new methods of applying the fundamental and acknowledged principle of the right to intercept such trade.

BLOCKADES

The rules for the establishment and conduct of blockades were fairly well established when the London Conference was called. Paper blockades, such as were established by the Berlin Decree of Napoleon and Great Britain's Orders in Council were considered illegal, and it was held that military blockades must be efficient. Pacific blockades were generally recognized. The London Declaration adopted some rules that were rather stringent for the belligerent, and the blockade of neutral territory was declared illegal.

When the World War opened it was generally recognized that the use of submarines made a close blockade impossible. The geographical position of Great Britain and France made the seizure of all vessels bound directly for enemy ports an easy task, except those sailing from Scandinavian ports through the Baltic. Seizure without condemnation was frequently practiced and neutral cargoes were bought by Great Britain, in many cases, notably cotton, and the vessels released. Eventually all neutral trade with Europe was controlled by the Allies and the passage of goods to and from Germany became virtually impossible. Notice was given by the Allies of the intention "to detain all commerce on its way, to or from the enemy countries. . . ."

IMMUNITY OF PRIVATE PROPERTY AT SEA

Immunity of private property at sea was suggested by Benjamin Franklin. It was again introduced by Mr. Marcy at the Paris Conference as an offset to the abolition of privateering. Our commerce was large, and our naval force negligible at this time; and the use of privateers was our only chance of reprisal should our commerce be abused. So unless private property became immune, we would continue to use privateers. The discussions

on this subject at the Hague Conferences were limited and academic. Before the Second Hague Conference, Admiral Mahan protested against the advocacy of this doctrine by Americans, and showed the lack of analogy between the so-called immunity of private property on land and at sea. Of course contraband has always been excepted from this immunity, as advocated; and with the great extension of contraband articles, such immunity becomes valueless.

REMOVAL OF PASSENGERS FROM NEUTRAL VESSELS BY BELLIGERENTS

During our Civil War Commodore Wilkes removed Slidell and Mason, in the diplomacy Service of the Confederacy, from the British mail steamer *Trent*, bound to England. Before this case, it had generally been held that only military persons were liable to capture, and that the vessel was liable to condemnation if bound to a belligerent port. The British authorities made a peremptory demand for the release of Slidell and Mason, and our Government finally complied with this demand; as they were not military persons, and their destination was a neutral port.

It must be admitted that two diplomatic officials may be more injurious to the capturing belligerent than a number of military persons. The *Trent* being a mail steamer, to have seized her and brought her into port would have caused considerable loss and inconvenience, so she was released by Wilkes. At the time authorities on international law seem to have condemned Wilkes for not bringing the vessel in for judicial examination. It is difficult at this time to see on what grounds such an opinion was formed. The *Trent* was proceeding on her regular mail trip from one neutral port to another. The two diplomats were taken on board as passengers, and their position in the service of the Confederacy was a matter of general knowledge. The whole question was as to the liability of diplomats to seizure. The British Government indignantly protested in the negative. Our Government reluctantly yielded under severe pressure.

Article 47 of the Declaration of London says:

Any individual embodied in the armed force of the enemy, and who is found on board a neutral merchant vessel, may be made a prisoner of war, even though there be no ground for the capture of the vessel.

Here the necessity of bringing the vessel in for judicial examination is abandoned; but the rule avoids the mention of persons other than military.

In the World War the right of seizure of passengers from neutral vessels was expanded beyond that previously accepted. In the case of the *China*:

Mr. Lansing informs Mr. Page that the Department is advised by American Consuls in Hong Kong, Nagasaki, and Shanghai, and by the owners of the American steamship *China*, that on the eighteenth instant the British Cruiser *Laurentic* stopped the *China* on the high seas, about ten miles from the entrance of the Yangtze Kiang, boarded her with an armed party, and despite the Captain's protest, removed from the vessel twenty-eight Germans, eight Austrians, and two Turks, including physicians and merchants, and took them to Hong Kong, where they are detained as prisoners in the military barracks. As it is understood that none of the men taken from the *China* were incorporated in the armed forces of the enemies of Great Britain, the action of the *Laurentic* must be regarded by this Government as an unwarranted invasion of the sovereignty of American vessels on the high seas. After the notice given to the British Government of this Government's attitude in the *Pepenbrink* case in March last, which was based upon the principle contended for by Earl Russell in the *Trent* case, this Government is surprised at this exercise of belligerent power on the high seas far removed from the zone of hostile operations. Ambassador Page is directed to present this matter to the Government of Great Britain at once, and insist vigorously that if facts are as reported, orders be given for the immediate release of the persons taken from the *China*.

The substance of the reply to this demand was:

I do not think it will be disputed that persons of this description must be placed within the category of individuals who may, without any infraction of the sovereignty of a neutral state be removed from a neutral vessel on the high seas. The object of their journey was to find another neutral asylum in which they might continue their operations against the interests of this country.

As in the *Trent*, here we have a neutral mail steamer proceeding from one port to another. The destination of the passengers was a neutral port, and the persons removed were not in the diplomatic service, but it was alleged that they were conspirators against the interests of the British. In this case the demand for release was refused and at this late date Commodore Wilkes was more than vindicated by the British Government.

In considering the acts of the Allies, the great difference between the World War and previous wars must be remembered: the extent of Europe covered by the war; the number of troops engaged and the vast amount of machinery used by the armies; the improvement in war machines and the introduction of new implements of war; the larger percentage of the male population included in the armies; the great numbers of the people, both male and female, devoted to the manufacture of war material; and the increased facilities for transportation in most European countries. Chief Justice Chase says:

Trade with a neutral port in immediate proximity to the territory of one belligerent, is certainly very inconvenient to the other. Such trade, with unrestricted inland commerce between such a port and the enemy's territory impairs undoubtedly, and very seriously, the value of a blockade of the enemy's coast. But in cases such as that now in judgment, we administer the public law of nations and are not at liberty to inquire what is for the particular advantage or disadvantage of our own or another country. We must follow the lights of reason and the lessons of the masters of international jurisprudence.

Chief Justice Chase in this case decided that the articles in question were contraband, and were destined for the enemy and were thus subject to condemnation. In the World War Holland afforded an example of the "inconvenient" neutral country. Lord Stowell says:

All law is resolvable into general principles: The cases which may arise under new combinations of circumstances, leading to an extended application of principles, ancient and recognized, by just corollaries, may be infinite; but so long as the continuity of the original and established principles is preserved pure and unbroken, the practice is not *new*, nor is it justly chargeable with being an *innovation* on the ancient law, when, in fact, the court does nothing more than apply old principles to new circumstances.

There can be no doubt that "the ancient law" requires that there shall be no interference with or aid given by neutrals to belligerents and that belligerents have the right to prevent such aid or interference. There may be differences of opinion as to the justice of the acts of the Allies in interrupting our commerce, but no good American could wish that the results should have been otherwise or desire that any aid or comfort should have reached the Germans from our people.

In spite of the limited amount of information that the hand of Creel permitted to reach us, there was, undoubtedly, much feeling against the British authorities for, what seemed to us, their arbitrary acts. How important our Ambassador to the Court of St. James regarded this danger is shown in the account of his handling of the *Dacia* matter.

It would seem important that some agreement should be reached with the principal naval powers as to the laws of war at sea to govern in the future. The rejection of the Declaration of London throws us back to the laws and customs governing prior to the World War, with the additional decisions of the belligerent courts. From these may be drawn rules that, while not affecting the rights of the belligerents, may at the same time lessen the burden placed on neutrals; remembering that any hindrance to the execution of belligerent rights tends to lengthen wars, and any increase of friction with neutrals in the execution of these rights tends to draw them in, and so increase the area of the war.

The right of search, as extended during the late war into a right of detention at belligerent ports to facilitate the search for contraband, was a most serious injury to the legitimate trade of the neutrals, and cause of great friction. Even when the detention was short the removal of the ship's papers for examination by a central authority was felt unnecessary, and as possibly affording an unfair advantage to the belligerent merchants. At one time the ships were required to pay pilotage and port dues, cost of unloading and restowing the cargoes, to facilitate a search, and prior to release to sign a quit claim for all damages incident to the detention. Upon protest by our Government, this injustice was stopped. If all merchandise intended for the enemy were declared contraband, this would remove all justification for detention. Destination of the vessel and the goods would be the only question, and this could be answered by an examination of the ship's papers, and her position at the time of examination.

There can be no question but that the experience of the World War shows the necessity of greatly extending the list of contraband to preserve belligerent rights, and the greater danger of creating a list of goods not to be declared contraband, as was done in the Declaration of London. So extended has the contraband list become that it would work little injury to the

neutral to extend it to all merchandise; and this injury would be more than offset, if such extension obviated the necessity of detention in harbor and an extensive search.

It would be difficult to argue against the extension of the doctrine of continuous voyage, as was decided upon by Great Britain and France, with consistency, in view of our extension of the doctrine in our Civil War; and it may be well, for both neutrals and belligerents, if the practices adopted in the World War be acknowledged as lawful; and neutral blockades to force embargo decrees, or the creation of oversea trusts, or both, be accepted as legal. It certainly would be difficult to refuse the right of declaring a blockade of neutral coasts, in view of the many accepted cases of "pacific blockade." This was one of the unfortunate limitations of belligerent rights in the Declaration of London.

When a belligerent finds that the position of a neutral nation is such as to permit unrestricted commerce with the belligerent's enemy, he may demand that the neutral shall declare an embargo against the export of such goods to the enemy, or shall create some such corporation as "the overseas trust"; and he may enforce this demand by a "pacific blockade." Some such rule would serve to settle the course of neutral trade in a regular manner, and relieve it from much annoyance and loss, and should more than compensate for the loss of such trade as might have been carried on with the belligerent. Such rules would obviate many causes of friction that have arisen between neutrals and belligerents, and would be easy of application where, as in the World War, the naval forces of one side were so powerful as to make it necessary to deal only with the belligerents with the superior force. Where the naval forces were more equally balanced, the difficulties of the neutrals would be greatly increased.

It might be suggested that it would be a good rule to make all trade with an enemy unneutral, and require each neutral to put a stop to such trade. Such a rule would be contrary to our former sea laws, under which the neutrals could supply a belligerent with any merchandise unless forcibly prevented by another belligerent. It would not be in accordance with the best interests of humanity, as it would tend to lengthen wars by removing a portion of the value of superior force, in that the belligerent with a superior

force would receive no greater trade from neutrals than the one with the weaker force. Besides it might tend to draw neutrals into the war. Self-interest should prevent any nation with a strong sea force from agreeing to such a rule. In the World War such a rule would have worked greatly to the disadvantage of Great Britain and her Allies, and would have caused an enormous loss to all neutrals; and it would have been impossible for any administration to keep the people of the United States out of the war if England were starving for want of food supplies. Our earlier entry into the war would have been an advantage in this particular case; but in general it would seem that the fewer countries drawn into a war, the better for humanity.

The difficulties to be met in revising the laws of war at sea are shown in the efforts of the convention that produced the Declaration of London. The differences between the theories on which these laws are founded, adopted by Great Britain and ourselves, and those adopted by Continental Europe, are fundamental; but it would seem possible for us, with Great Britain and her Allies in the late war, to come to some agreement on the extension of the old laws which, while decreasing the rights and increasing the obligations of neutrals will, when in working order, do little injury to neutral trade, as the neutrals will gain in regularity what they lose in volume of trade.

Paper blockades are obnoxious. Close blockades are seldom possible, but to be legal a blockade must be effective. The amount of effort and force necessary to meet this requirement will be a source of frequent argument in the future as it has been in the past. Certainly Great Britain's blockade in the World War was effective. In its enforcement, time should be given for full knowledge by neutrals. The penalties for violating a "neutral blockade" may be made more lenient than those for violating the blockade of an enemy.

Certainly great difficulty will be encountered in drawing up a set of laws that will meet with the approval of the principal maritime nations, with their conflicting rights and interests, and however carefully drawn, much must be left to be settled by diplomacy during and after war; for a too rigid set of rules is likely to result in the rejection of all rules during a strenuous war. But it should be possible to obtain a rule against seizure without

early trial and damages, unless probable cause was found by the Court. It might be possible to revert to the preliminary examinations by the courts, as in the former practice of Great Britain and the United States. And some rule should be adopted as to what class of belligerents can be removed from a neutral vessel by another belligerent.

The decisions of an international court may be useful to determine cases after a war, and be of value to the nations involved; but they can hardly be delivered in time for the relief of the merchant. The civilization of the most advanced nations must undergo much improvement, before the jurist can replace the diplomat, and allow the judicial determination of all international disputes to prevail.

THE END OF THE TRAIL

BY LIEUTENANT N. C. GILLETTE, U. S. NAVY

"I'D GIVE a thousand dollars to be on the *Iowa* during that firing tomorrow," remarked one of the reporters who was in Panama to cover the event.

"You'd give another thousand to be off after that salvo," remarked one of his hearers the following day when the *Mississippi* had found the range and began dropping M. P. I.'s all over the doomed warrior.

Eventually a complete report of the *Ex-Iowa* firing will be published to the service. This will include the interesting though rather dry data as to hits, dispersion, and all the other necessary items of a complete report. In the meantime it will probably be of interest to know what general impressions were registered on the spectators as they watched the destruction of this old ship that has for years held an affectionate place in the hearts of the service.

The first exercise was a five-inch firing. This was very interesting but proved to be only mildly exciting when compared to the fourteen-inch firing. The salvos got on very quickly and a fairly large percentage of hits were made. A number of hits were scored in each of several salvos which indicated a very good pattern. These shell functioned well on impact and bright yellow points of light indicated when the shell hit and burst. The smoke would clear away quickly, however, and the general effect was much like the efforts of a small boy throwing Fourth-of-July torpedoes against a brick wall.

The next exercise was with a limited number of fourteen-inch shell of a special type. Due to the small number of shell fired only a few hits were made and no extensive damage was done.

So far the radio control and the power plant had functioned in an efficient and uncanny manner. It was something new to see a ship churning along with a bone in her teeth and smoke belching

from her boilers and to realize that no one was on board—not even the reporter with the thousand dollars.

The following day everything was going along nicely when, for some reason unknown, this unusual craft became temperamental, reversed her course and scattered her surrounding tormentors in all directions. It would have been a pretty kettle of tin fish had the report come to Washington that the *Mississippi* had been sunk by the *Iowa*!



SHE SANK WITHIN TWO MINUTES AFTER THIS PICTURE WAS TAKEN
U. S. S. *Arizona* in the Foreground

A tug was soon alongside, however, and the trouble shooters scrambled abroad. They succeeded in convincing the honorable old hulk that resistance was useless and she was soon on her way again. But before the next firing started, she stopped and the smoke gradually faded from her stack.

The next phase was a repetition of the fourteen-inch firing of the previous day except that a greater number of projectiles were fired. The first day's firing had been directed against her starboard side. This firing was at her port side. During this "battle" hit after hit was scored. Towering columns of water fell upon her. Heavy clouds of smoke hung about as shell after shell burst on her decks or within her compartments. Huge chunks of steel flew

high in the air. A continual rain of small fragments splashed about her. One salvo threw tons of water on her forecastle that drained off in a cataract as she took a slight list to port. One shell crumpled the bridge. Another uprooted the towering forward smoke pipe and laid it down nicely across the forward starboard eight-inch turret. The cage mast was riddled through and through but remained steady to the last though practically all the elements had been cut before the end of bombardment. Then the firing ceased, the smoke cleared away and we steamed close by to observe the havoc as she floated serenely on the placid bosom of the Pacific.

She had an appreciable list to port. Large black gaping holes dotted her side. Smaller holes made by flying fragments were everywhere. Daylight could be seen through her bow in several places. Smoke was again belching from her after stack. This may have been from an oil fire below decks. The inspection party went aboard for a few minutes but were soon recalled and the *Mississippi* squared away for the final attack.

Now the starboard side was exposed to the fire. The shell used in this, the final stage, was armor piercing. Now we were to see some real execution. Again the thunderous concussions and reverberations were heard as the relentless salvos struck the sturdy craft. But now they pierced her through and through, bursting with terrific force from stem to stern, above and below the water line. Livid red blotches were seen for a moment as each shell burst. Now and then a beautiful canary yellow cloud intermingled with the black clouds of smoke. Again huge fountains of green water fell in torrents upon her. What of the reporter and his thousand dollars now?

She was still listing to port, but now she proudly righted herself only to list to starboard a few minutes later. Her bow, slowly, almost imperceptibly, sank until her forecastle was awash. Her quarterdeck, the scene of many honors in peace and war, still proudly maintained its dignity. More and more she listed. The firing ceased. The foretopmast toppled and sank below the water. Slowly, quietly, she rolled to starboard. Her towering cage mast slipped into the water. For a moment her port side protruded from the water like a whale basking on the surface. Then with numerous boiling, bubbling inverted bowls to mark the

escape of air, the veteran of two wars silently disappeared. Sea-planes circled and dipped above the spot like huge birds cheated of their prey.

"Attention!" Every man on the surrounding ships stood quietly at attention. A twenty-one gun salute was fired by the flagship that bore the Secretary of the Navy. A feeling of quiet sadness pervaded the fleet that steamed slowly away in the soft tropical twilight toward the anchorage.

THE PROPOSED AMALGAMATION BILL

BY COMMANDER C. W. FISHER (CC), U. S. NAVY

ON MARCH 7, 1923, a proposed Amalgamation Bill was prepared by the Navy Department. The following memorandum or explanation accompanied the bill:

First, it was assumed that the amalgamation should take place along the lines of the amalgamation in 1899 of the former engineer corps with the line.

Second, the following conditions were thought to be those toward whose accomplishment efforts should be made: viz.,

- (a) No increase in cost to the Naval Appropriation.
- (b) No loss of rank or possibilities of promotion by any officer concerned.
- (c) No advance in rank out of the ordinary for any officer concerned.
- (d) Abolition, as far as possible, of temporary officers.
- (e) Setting a definite date above which officers would continue to perform their present corps duties until separated from the active service by death, retirement, resignation, etc.
- (f) Setting a date below which all officers would be required (probably) to qualify for combination duties.
- (g) Insuring that Chiefs of Bureau in the Bureaus of Construction and Repair, Supplies and Accounts, and Yards and Docks should be taken from officers now in the construction corps, supply corps, and civil engineering corps, respectively, until the time when practically all officers now concerned would go off the active list.

The difficulties encountered in attempting to formulate appropriate rules are somewhat extensive. The question as to how to handle the amalgamation, whether by date of commission, whether by date of precedence, or some other method or combination is influenced by the fact that officers in these corps at present have no age in grade retirement, also that naturally the smallest corps, that is, the construction corps and the civil engineer corps, relative to the supply corps led to their getting larger percentages by the Bill of August 29, 1916; also at a certain time, thirty years back, there was an hiatus in the supply corps when practically no appointments were made for ten years; also that through fluctuation in promotion one corps for a time has slow promotion in the lower grades and fast promotion in the higher grades, and others vice versa.

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It will be noted that in general advantage accrues to the former staff officers because of the putting into effect the age in grade retirement provision upon their transfer to the line, and advantage accrues to the present line officers of lower grades from the fact that, in general, the staff officers transferred are probably at a greater age on account of there not having been placed into effect, the age in grade retirement in the present staff corps. In time these two propositions will be equalized to the benefit of all former corps.

2. Before discussing in detail the fourteen sections of the proposed bill, a few general remarks as to its purpose, general character, scope and effect will be presented.

3. This article is not the attack of an "anti-amalgamationist," nor is it the defense of an "amalgamationist." It is an attempt to examine the proposed bill from all sides, to discuss its most important features; and, it is hoped, to bring to light certain conditions intimately connected with amalgamation, which have not heretofore received the attention they merit.

4. *Purpose of the Bill.* The proponents of the bill have failed to state what benefit is to accrue to the Navy if the bill becomes a law. It is natural to suppose that direct and tangible benefits, to the Navy and to the nation, should result from the bill, otherwise there would be no purpose in enacting it into law. Nevertheless, this important point has been omitted. There is no doubt that certain conditions existing at present in the Navy are unsatisfactory to practically all naval officers, but I believe it can be clearly shown that these conditions are not necessarily caused by the existence of separate corps in the Navy, and furthermore, that amalgamation of the technical corps with the line will not of itself correct these conditions.

5. Upon studying the proposed bill carefully it is plainly evident that it is not an *amalgamation* bill, but an *elimination* bill. After those officers above thirty-one years of age, who are now in the staff corps and who do not qualify for line duties, have disappeared from the Navy List, there will remain none who are expert in the specialties necessary for the proper administration of the Navy's business. Absolutely no provision whatever is made for the recruiting and training of specialists in pay matters, naval construction and civil engineers, nor is there any assurance that future officers who may desire to specialize along these lines will be permitted to devote the principal part of their time to such

specialties. It has been stated that these matters should be left to the administrative action of the Department, that is, the Secretary of the Navy; but the experience of those officers who have been interested in engineering from 1898-1923 is of itself sufficient to deter any ambitious officer from attempting to specialize in any work.

6. The proposed bill is an elimination bill rather than an amalgamation bill in another respect. Four years from the date of its passage, say July 1, 1928, the provisions now applicable to the line regarding enforced retirement due to age in grade are to be applied to the members of the former staff corps. A glance at the official Navy Register of January 1, 1922, will show that on July 1, 1928, this age in grade retirement rule will remove from active service a great many of the skilled and experienced officers of the rank of rear-admiral, captain and commander of the construction corps, the civil engineer corps, and the supply corps. On July 1, 1928, about sixteen out of twenty-three civil engineers of these ranks will be retired; in the construction corps fourteen out of forty-seven; and in the supply corps thirty-five out of seventy-seven. It is true that such a wholesale removal at one time of experienced officers in these higher grades will induce more rapid promotion, but the loss of their training and experience is one that the Navy can ill afford to stand, especially when it is considered that no legal means are provided whereby such officers can be replaced.

7. *Inequalities in the Bill.* One particular feature of the proposed bill is especially repugnant to those staff officers who have heretofore worked hard at their profession and who take pride in it. The bill provides that any former staff officer must pass a qualifying examination before he can perform line duties, but on the other hand, any line officer can be ordered to perform any staff duty without having to pass a qualifying examination.

8. The arrangement of officers on the single list in accordance with their "adjusted precedence" as prepared presumably by the writers of the bill, not only shows certain apparent inequalities that will cause invidious comparisons to be drawn as between individual officers adversely or beneficially affected by this arrangement, but, which is more important, shows a condition of "bunching" of staff officers and line officers in certain positions

that will eventually operate to delay promotion of the line officers below these groups of staff officers, and vice versa; and at recurring periods will cause the tops of the grades of rear-admiral, captain and commander to be filled by officers of the former staff corps. For example, at the top of the commander's list on the combined list, there is a group of about thirty staff officers of whom about twenty-two are paymasters. If these officers remain in the pay corps, they would probably not be promoted for four or five years; but being transferred to the combined list in this advantageous position, they will probably all be promoted in less than two years.

9. Such groups of staff officers at the top of any one list, particularly in the ranks of rear-admiral, captain and commander, will inevitably reduce the number of line officers in these ranks available for command and military duties afloat. Also the line officers immediately following the group of thirty or more staff officers at the top of the combined commanders' list will have their promotions delayed at least one or two years until after the staff officers have been promoted, whereas, without amalgamation these officers could expect promotion in the near future.

10. *Summary.* Summarizing then, the proposed bill is a measure which will eliminate the technical corps instead of amalgamating them; this elimination being due, at first, to the operation of age in grade retirement, and in the future, to lack of any provision for recruiting and training future specialists.

POSSIBILITIES OF AMALGAMATION

As has been intimated before, whether any officer is in favor of, or opposed to amalgamation depends in the first place upon the definition of amalgamation. This much used term seldom means the same thing to any two officers. A "pro-amalgamationist" when pinned down, will usually say that it is a means for putting all officers on the same list, that it will do away with "cliques," stop the old "line and staff" arguments, eliminate friction, and increase flexibility in assigning officers to duty. Such replies are vague and indefinite, and leave out of consideration the very important fact that if the Navy is to keep up-to-date in its rapidly increasing variety of engineering and technical duties, then the Navy must provide officers of skill and experience in

each of these special lines. Recent public addresses by high-ranking naval officials have stressed the improvements and discoveries made by the Navy along engineering lines that have been of benefit not only to the Navy, but to the country at large. Does anyone believe this work could have been done unless the naval officers who did it had *specialized* in their work? Does anyone really believe that the "all-round" naval officer can produce the *best* in radio, in turbine design, in boilers or propellers, in the design of hulls, in the lay-out of power plants? The *best* in any line of endeavor can only be produced by one who, having the ability and the desire, is afforded the opportunity to work in his chosen line. To reduce it to an absurdity, why does the "all-round" man in civil life call upon doctors, lawyers, architects, and garage mechanics?

But, leaving this phase of the question for the moment, let us return to the definition of amalgamation. After being discussed more or less continuously for fifteen years, a few particulars are available from which a scheme, if not a definition, can be built up. For example:

a. Few, if any, officers would object to removing the staff distinguishing marks from the uniform.

b. Also, practically no objection would be made to abolishing the staff titles for the various staff grades, such as naval constructor, pay director, assistant civil engineer, thereby leaving the titles of rank alone; that is, lieutenant, captain, etc.

c. It is also believed that there would be no objection to combining all officers on one lineal list in the Navy Register, if each officer were placed in his proper position on that list. The difficulty in this regard is deciding just what is the "proper place" for the staff officers transferred thereto. This will be taken up again later in more detail. For the present, assume that the "proper places" have been found.

d. There would appear to be no objection to suffixing to an officer's name, an asterisk or letters to indicate that he was specially skilled and trained along certain particular lines, such as naval construction, civil engineering, radio, storekeeping, gunnery, yard administration, etc.

e. Finally, it is almost universally admitted that duty at sea is a most valuable and necessary experience in the life of every

naval officer, with the possible exception of the civil engineer. Even in their case I believe a certain amount of sea service would be of inestimable value in perpetuating naval tradition, increasing the esprit de corps of the Navy as a whole, and briefly, in teaching all officers to "speak the same language," and work for the same big purpose—the Navy as a whole.

What have these five proposed steps accomplished? A single list of naval officers with identical uniforms and titles for the same rank has been created, on which special aptitude and training is indicated, and provision has been made for all officers to perform a certain amount of sea service. On the face of it this would appear to be a fairly reasonable and accurate definition of amalgamation.

But several important things remain to be decided before such a list with its seagoing principle can be made to "work." These are:

- a. The arrangement of the list.
- b. The frequency and duration of sea duty.
- c. The kind of duty to be performed, and its corresponding authority and responsibility.
- d. Rights of promotion and retirement.
- e. The recruiting and training of specialists.

If an agreement satisfactory to all concerned can be reached on these five points it seems evident that the difficulties of making the amalgamated list "work" will have been solved. On examination, however, it will be found that the difficulties are not very easy to surmount. Personal interest, temporary or future advantage, corps spirit, professional pride, honest differences of opinion as to what is best for the Navy, past irregularities in promotion, questions as to legitimate scope of duty, succession to command, and many other vexatious problems will present themselves. The following outline suggests methods of treating these questions. The writer holds no brief either for or against "amalgamation," but, having indulged in "destructive criticism" when discussing the "fourteen points" of the proposed bill, is now trying to examine in a constructive way the possibilities of "amalgamation" on the general supposition that "something is wrong" and therefore "something ought to be done about it."

That "something" is wrong, and has been wrong for many years is the firm conviction of a large and increasing number of naval officers, but whether this "something" is the corps, the appropriation system, the bureaux, the accounting system,—or all or none of these, only a few have taken the trouble to analyze.

It is convenient to take up the five points in a slightly different order from that in which they were first presented.

Right of Promotion and Retirement. This touches the heart of personal interest and possible selfishness. The comfort and well-being of an officer's family may depend upon it, and as a result, the value of his services to the Navy. Rare is the man, who can render loyal, whole-hearted service, when smarting under a conceived injustice affecting his rank and pay, and his assurance of a livelihood when his active work is finished. Therefore, all officers now in the service should be assured of at least the same privileges as to these rights that they now enjoy. This is, in effect, nothing more than enunciating the clause that usually appears in personnel legislation; that nothing in this bill shall be construed to reduce the pay and allowances now granted by law, etc. Practically, it means that the age in grade retirement rule should be made optional and not obligatory in its application to the officers of the former staff corps who continue their technical duties. Other existing retirement laws should remain in force as now written or as changed in the proposed bill. Ex-warrant officers should have graded retirement based on length of service in grade instead of age in grade. This is covered by existing law.

So much for retirement. As to promotion, the same principles apply, but they are perhaps not so easily applied. Irregularities in promotion have existed in the past in the line as well as in the staff. Unequal probabilities of promotion even now exist between officers of equal length of service but in different branches of the Navy. It is, I believe, humanly impossible to draft a law that will correct existing conditions and at the same time provide equal justice for all in the future. All of the inequalities which now exist had their inception in irregularities in taking officers into the service. To prevent such troubles in the future, therefore, provision must be made for taking men in at the bottom as regularly and as steadily as is compatible with the changing

allowed number of commissioned officers. This applies to the creation of specialists as well as to the graduates from the Naval Academy. For the present members of the staff corps the most equitable scheme for promotion would be, when a given number of vacancies in any rank are to be filled, to select officers in proportion to the total numbers in the line and staff as they exist on a given date, say January 1, preceding the passage of the act. For example (without attempting to use the correct numbers), if twenty-five commanders are to be promoted, select one civil engineer, two naval constructors, three paymasters, and nineteen line officers. This is not by any means a perfect solution, but it does provide an assurance of promotion that is wholly lacking in the proposed bill.

Fear has been entertained in some quarters that the constitution of the Selection Board, six line and three staff, with seven votes required for selection, might result in partiality. An alternative would be a separate board of staff officers for each group of staff officers to be selected, or a varying board having six line members, and three staff members all of the same corps as the staff officers to be selected. The latter alternative seems the best solution.

The examination for promotion for former staff officers now above the age of thirty-one and below the rank of commander should be in two parts; first, a broad examination on general naval subjects; and second, a special examination on staff or technical duties. Officers of the former staff corps of the rank of commander and captain should only be given a technical examination. Officers now below the age of thirty-one should be examined as required for line officers at present, unless they have qualified as specialists (of which more later); in which case they would be given a broad examination on general naval subjects and an additional examination on their specialties.

Arrangement of the List. The inequalities, and the "bunching" of staff officers on the combined list prepared according to the "adjusted precedence" as provided in the proposed bill have already been referred to. The initial arrangement of the combined list is highly important, as upon it may depend an officer's chances of promotion and retirement. In accordance with the principles expressed in the preceding remarks on promotion, it is suggested that the best solution would be to scatter the former

staff officers in any one rank, among the line officers of the same rank, from the top of the list down, in proportion to the number of line officers and staff officers in the Navy on any given date. If the promotion scheme outlined under the preceding section be agreed to, then the initial arrangement of the combined list ceases to be of major importance, and resolves itself into little more than a list of precedence at official functions. If, on the other hand, the "proportional promotion" scheme just referred to be not accepted, and further, if the age in grade retirement rule be applied to former staff officers, then the initial arrangement of the list will vitally affect all officers' chances for promotion and retirement.

Frequency and Duration of Sea Duty. The proposed bill requires that all officers, except staff officers now holding the rank of captain, shall have had at least two years' sea service on sea-going vessels, in grade before promotion. The average age of the graduates of the Naval Academy may be taken at twenty-two. The compulsory retirement age for captains is fifty-six. There are therefore thirty-four years of active service below the rank of rear-admiral. From ensign to captain inclusive there are six ranks through which an officer passes, in each of which at least two years must be spent at sea. Six times two is twelve; that is, out of thirty-four years' service, twelve years (more than one-third), must be spent at sea. For the "all-round" line officer this is perhaps not too much. But it is seriously questioned whether such a large proportion of sea duty is desirable or necessary in other cases. In many instances the specialty which an officer desires to follow may be pursued both at sea and ashore, so that a large proportion of sea duty will not operate to his detriment as such specialist. On the other hand there are several classes of naval work, among which may be mentioned shop management, administration and management of shore stations, civil engineering work, storekeeping ashore, accounting and cost-keeping, etc., in which service at sea for protracted periods can offer few opportunities for experience and improvement except in a very general way. Wiping out twelve years from a possible total of thirty-four years of application and usefulness in such cases is decidedly bad business. This rigid requirement of two years' sea service in each grade should therefore be modified for certain specialists.

At present the civil engineers do not go to sea at all. The supply officers have practically the same amount of sea service as the line. The naval constructors lie between the two. Few line officers realize the amount of *practical* sea duty performed by naval constructors. The constructor members of trial boards and the Board of Inspection and Survey for Ships gain sea experience in quantity and quality that is exactly what is needed for making alterations and repairs on old ships and perfecting the design of new ships. Such sea-going is for the avowed purpose of finding out "what is the matter," and "seeing how it works" and provides an essential link between the designer and the operator. A naval constructor on the Board of Inspection and Survey goes to sea every week and observes the behavior of vessels when performing evolutions that many a line officer sees but a few times in his whole career.

But, there is no doubt that a certain amount of sea service for all officers would be highly beneficial for many reasons. The amount and duration of it for members of the former staff corps now above the age of thirty-one, and for our future specialists, should be adjusted to the requirements of the staff officer's technical duties and the needs of the specialty. The following are offered as a substitute for the two-year requirement of the proposed bill:

- (a) Commanders, captains, and rear-admirals of the former civil engineer and construction corps should not be made to go to sea at all as a requirement for promotion. They should be sent to sea upon their approved application or when circumstances connected with their corps' duties require it. Except when on special duty as "observers," they should be assigned such duties at sea, commensurate with their rank as they may demonstrate their ability to perform. (In the case of civil engineers this will have to be interpreted liberally.)
- (b) Members of the former staff corps below the rank of commander and above the age of thirty-one, should be required to go to sea for not less than one year in each grade below rear-admiral for civil engineers and naval constructors, and two years for supply officers.

- (c) All officers now below the age of thirty-one should be required to have two years' sea service in each grade before they can be promoted; except that when any such officer has elected to follow a specialty, has been given training or schooling in such specialty and has qualified therein, the sea service required of him in the grades of lieutenant commander, commander, and captain shall be only such amount as shall have been determined by a board appointed by the Secretary of the Navy as proper for such specialty.

Recruiting and Training of Specialists. One of the most important objects to be attained by any amalgamation scheme should be the welding of the officer personnel of the Navy into a harmonious whole, each member of which should be trained to co-operate with all the rest for the good of the Navy. This applies to specialists or members of technical corps with even more force than to the line. The best way for all officers of the Navy to gain the same "Navy" viewpoint is to require all of them to receive the same training on entry into the service. Excepting the rights of certain warrant officers to be given commissions, therefore, all officers should be taken from the Naval Academy. This single source for all future officers can then be made a most powerful means for inculcating those traditions, naval habits, and ideas which form the backbone of naval morale, at a time when youth is particularly susceptible and retentive. Right ideas gained between the ages of sixteen and twenty-three usually stick, and a subsequent diversion of duty to special lines seldom destroys the feeling of brotherhood engendered by four years of close contact at the Academy. By all means therefore, let us recruit all of our officers through the Naval Academy.

Starting then with a common education, principally "book learning," a couple of years at sea is required to grow up, and to see and experience the application of this "book learning" to the manifold activities of that great machine we call the Navy. Until such practical experience has been obtained no young officer is really competent to decide just what particular phase of navy work appeals to him more than any other, and whether or not he is fitted for it. Having finished his two years at sea, he should be permitted to express his desire to specialize, and if his request

be approved he should be given the additional training or schooling which will provide the ground work for becoming thoroughly competent in his specialty. Three corps of the Navy having been abolished, and there being such a great variety in naval work, these specialties should not be limited to those heretofore included only in the supply, civil engineering and construction branches. The Secretary of the Navy should establish certain "authorized specialties" for which the Navy has need, and for which courses of training will be established. In these "authorized specialties" might be included:

Ordnance, aviation, yard administration, naval construction, electricity, radio, submarines, engineering, cost keeping, store-keeping, civil engineering, strategy and tactics, etc.

The list of "authorized specialties" should be revised from time to time to keep pace with the advances in the art of war and the development of naval material.

No officer, even after completing a special course of instruction, should be qualified as a specialist until he attains the rank of lieutenant commander, but before reaching that rank he should not only be given ample opportunity to pursue his special work, but in addition, he should be required to pass a graded examination in his specialty prior to each promotion. On examination for promotion to lieutenant-commander his record of performance in his specialty as shown by his fitness reports and all other available sources of information, should be carefully weighed and his successful passing should be indicated by adding to the wording of his commission "qualified in ——." Failure to pass in his specialty in any subsequent examination for promotion should involve the loss of his qualification, and the additional requirement of having to pass the usual examination for a non-specializing officer before he can be promoted.

Each officer specialist, both before and after qualifying as such, should be given duty involving the exercise of his specialty for at least two-thirds of his time in each grade. (Assuming an average of six years in a grade, this means at least four years in each grade.)

The allowed number of specialists in the Navy and the allowed number in each grade, including those not yet qualified, should be established by the same board that fixes the number and desig-

nations of the "authorized specialties." When the allowed number in each grade is established, then the principle of "proportional promotion" will insure that the proper number of specialists is maintained at all times in each grade.

The scheme outlined under this heading provides that:

- (a) All specialists are Naval Academy graduates.
- (b) Courses of instruction are provided for all authorized specialties.
- (c) Specializing officers will be given duty corresponding to their specialties, plus a possible small amount of general duty.
- (d) Promotion for specialists is assured.

As a final remark on this particular phase of the personnel question I wish to urge the extreme desirability of every officer in the Navy taking the War College course. If personal attendance for all is not possible then at least the correspondence course should be required, and it should be taken as early as practicable in an officer's career.

THE KIND OF DUTY TO BE PERFORMED; ITS CORRESPONDING AUTHORITY AND RESPONSIBILITY

Inevitably, in discussing the four preceding headings, reference was frequently made to this most important question, because upon it depends the ultimate success or failure of any amalgamation scheme. With all due respect to the line's jealously guarded prerogative of exercising "military command," especially command at sea, the fact remains that unless every officer be given authority commensurate with his responsibility a tremendous handicap is at once imposed upon him and the success of his work is imperiled. If we desire to amalgamate, in the amalgamation must be included all of the privileges and rights of all parties to it, or else all parties must sacrifice the same rights. If this be not done, instead of amalgamation, we would have absorption or elimination and more or less injustice. The best solution of this question of duty and command that I know of is contained in the following proposed bill or part of a bill which is the result of much study on the part of another officer:

That officers of the Navy shall be eligible for any duty at sea or on shore compatible with their work to which the Secretary of the Navy,

with due regard to their training, experience, and demonstrated capacity, may assign them, and while so assigned they shall have and exercise full authority and command over all officers and enlisted men that may be serving under them.

In my opinion this quotation expresses briefly but completely all that need be said on this subject.

WILL AMALGAMATION SOLVE THE PROBLEM?

For the sake of argument, let us assume that there has been described an acceptable amalgamation and means for making it "work." Or, if neither the Navy Department's proposed bill nor the scheme proposed herein be acceptable, let us assume the existence of some other type of amalgamation. Will any amalgamation scheme remove the vague but none the less real troubles that beset us?

There are two kinds of duty in the Navy, that which leads to command at sea, and that which does not. Consolidation of the Navy List, and perfect flexibility in assigning officers to duty would make every officer potentially at least, available for sea command. But some able officers would rather not command at sea, and some, while invaluable for other work, are incapable of successfully commanding at sea. If all are placed on a single list, and the criterion of ability is made fitness for command at sea (as it properly should be for the majority of officers), then necessarily a small but important group of officers will not receive the recognition and rewards to which their special talents entitle them. On the other hand, the making of special classes formed of such officers has heretofore led to the creation of separate corps. Separate corps at once limit flexibility in assignment to duty, and have been assumed to be the cause of sharp differences of opinion and distressing internal friction. But does the recognition of special talents necessarily lead to separate corps, and do separate corps necessarily produce friction? A method has already been indicated whereby special skill can be rewarded—that is, guaranteed promotion and retirement—without having the alleged dangerous corps.

After all, what are the corps as they exist today? Offhand one would be inclined to say they are separate groups of officers, selected, educated and trained for the performance of certain

lines of work distinct from the work of the rest of the Navy. A little thought will show that this is not strictly true. Naval constructors are shop superintendents; "plain" line officers and "engineer" line officers are also shop superintendents. A naval constructor in Washington makes the drawings and prepares the specifications for work on a steering engine; at the yard a line officer has charge of this work. At some yards a naval constructor is manager, at others, a line officer. Line, constructors, civil engineers and supply officers, all deal with the supply, issue, and use of materials, small tools, machine tools and cranes. Again when at sea the line officer has charge of all material and machinery that come under the constructor at Washington. These examples can be multiplied indefinitely. There are many activities common to all these corps and the line, but there are also certain things peculiar to each corps. The design and repair of hulls for example, is peculiar to the constructors; the design of buildings and dry-docks, to the civil engineers; the disbursement of money and accounting (nearly always), to the paymasters; the design and operation of propelling machinery, to the engineer line officer, etc.

If a study is made of the evolution of our naval administration it will be found that originally the corps were strictly specialists and that they were the representatives in every respect of their corresponding bureaus. After the engineer corps was abolished the Bureau of Steam Engineering found itself without any corps representatives, and subsequent changes in navy yard administration have resulted in practically eliminating bureau representatives at navy yards. The growth of the bureaus incident to the increase in the Navy since 1883, and the increasing use of mechanical devices throughout the Navy, has caused an overlapping of bureau activities. The failure of the bureaus to parallel the navy yard and the ship organizations has aggravated this overlapping. As conditions stand today the doctor on board ship has charge of something that must be repaired by the engineer officer of the navy yard, but which is under the cognizance of the Bureau of Construction and Repair! This is, of course, an extreme, but nevertheless a truthful example of the overlapping of the duties of the corps and bureaus as they now exist.

The point of all this is that bureaus and corps, as organizations

and as individuals, have their duties and responsibilities so varied and mixed that everyone, in one way or another, has something to say about the other fellow's business. No bureau, corps, office, or other agency of the naval establishment has the complete authority, responsibility, and control of funds that is essential to the successful and economical performance of work. It is difficult to imagine a more fruitful source of friction and trouble. And it is to these conditions that we must look for our difficulties rather than to the lack of a single Navy list.

Take money, for example. Out of the amount allotted to a navy yard by the Bureau of Engineering nearly one-third is disposed of there as overhead, over which that bureau has no control. Furthermore, the money allotted to the yard by other bureaus determines to a certain extent the amount charged as overhead to the Bureau of Engineering. A decrease in Construction and Repair expenditures at a yard will automatically increase the overhead chargeable to Engineering. No bureau has more than a partial control of its funds, yet it is *responsible* for all of them.

Take personnel. An officer at a navy yard, or at sea, for that matter, is seldom responsible to fewer than three bureaus at the same time. The manager at a navy yard may and does receive conflicting orders from two or three bureaus. The engineer officer on board ship is responsible to the Bureau of Engineering and the Bureau of Construction and Repair, each having cognizance of part of the machinery belonging to the engineer officer.

Take material. An officer or a bureau is charged with the execution of certain work, but part, if not all of the material needed is usually provided by and in the custody of some other co-ordinate officer or bureau. If the necessary material is not available when wanted, who is to blame?

The system is to blame, and the system is responsible for nearly all the troubles erroneously attributed to corps—and for many more besides. The system, that is, the present distribution of money and duties among the bureaus; the vital differences between the organization at the Department, at yards and on board ships; the failure to modify one to suit the changing needs of the other; the hopeless efforts of the accounting system to meet the conflicting requirements of bureaus and yards; the perpetuation in the annual appropriation bill of lines of cognizance that should have

been changed twenty years ago; these are to blame. These conditions are not right. They are inefficient and costly. They inevitably produce friction and trouble. They should be corrected, and they can be corrected by a simple re-distribution of bureau duties so as to give each bureau complete control over its work and funds.

If one bureau could have all design work, another have charge of all work at industrial yards, another have all work at naval hospitals, and so on, so that as far as possible no man would have more than one bureau to look to for instructions and funds, the problem of friction between bureaus and friction between corps and individuals would practically disappear. Incidentally there would be marked saving in the cost of naval administration. Such a re-distribution of bureau duties involves each bureau having under it and in it many specialists. For example; the bureau in charge of navy yards, would, of course, require the services of specialists in yard administration, engineering, storekeeping, hull repairs and so on. Such a throwing together, for the execution of a common class of work, of diversified specialists would be the most practical kind of "amalgamation."

CONCLUSION

The foregoing somewhat lengthy discussion has attempted to describe an amalgamation which provides for the necessary specialists (which the Navy must have), preserves equally the rights of the specialist and the "all-round" officer, provides for sea service as needed for each class of officer, and insures that complete combination of authority and responsibility which must be vested in every officer if successful results are to be obtained.

Notwithstanding all this, neither the type of amalgamation described, nor any other kind of amalgamation will remove the difficulties under which the Navy is now operating, many of which have been erroneously attributed to the existence of separate corps. Amalgamation may help; but with or without amalgamation, most if not all of these difficulties can be eliminated by a re-distribution of bureau duties so that for the bureaus as for the individual officer, authority, responsibility and the complete control of funds shall form an unbroken chain, a condition which today simply does not exist.

ACROSS THE POLE BY PLANE

BY LIEUTENANT COMMANDER FITZHUGH GREEN, U. S. NAVY

THE latest polar controversy is of especial significance to navy men. It may be expressed by the hypothetical question:

Granting that an air route from Europe to the orient by way of the North Pole cuts their separation from 10,000 miles to 5,000, is it worth developing despite the risk and other obstacles entailed?

Intelligent conception of the problem is not easy without a brief outline of the steps that have led to present activity in arctic aviation. There is, to begin with, that amazing renaissance of northern exploration which the world saw in the century just past. After 2,000 years of prowling around the seven seas mariners began to concentrate on the one which surrounds the North Pole. There were two reasons for this: first, the possibility of a northern passage became acutely inviting; and second, simple circumnavigation of the globe had fallen into the hands of professional traders, thereby losing its "kick" for the true explorer. A third reason is worth recording, though it is quite open to dispute: the British Navy had seen naval warfare go into a decline after such delightful scrimmages as Trafalgar; and, seeking some worthy and appropriate stimulant, turned vigorously to the north. In passing, it is to be strongly doubted whether Nelson's thrill in the heat of battle ever exceeded those Franklin experienced while dodging billion-ton ice-islands through a Baffin Bay typhoon; not to omit that the dodging was done in a pair of recalcitrant square-riggers. Sir John Franklin, as we know, perished miserably and mysteriously with the entire crews of both his vessels. Ensued years of search for that ill-fated expedition; Dr. Kane of the United States Navy taking a leading part. Peary followed Kane. And the Scandinavians, not to be outdone, entered Nansen and his school in the race. DeLong, again of our navy, laid some of the foundations for Nansen's success; and Greely of our army contributed his tragically-won

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facts about Kane Basin to Peary's ultimate possession of the coveted Pole. It was an astounding century in exploration, full of brilliant exploits, undying feats of heroism, superb achievements.

There is one strange and moving fact about that century which bears poignantly upon the subject of this essay. To Hakluyt and to Peary the world gave its moiety of passing admiration. The morbidly curious and the timidly vicarious fed upon each ghastly tale of suffering and death. There was monetary reward; also medals, and other symbols of outward appreciation. Yet ever



ESKIMO HUNTER

The Eskimo, properly protected from the evils of civilization, will become the Arctic aviator's right-hand man.

was the question asked—jeered sometimes, almost: *Why do they do it?* And Hakluyt, or Kane, or Peary would reply: "To reach the Indies traveling west; to find Sir John Franklin; to give America the prestige of first reaching the Pole. . . ." Laughable! Such trivial reasons cannot even remotely account for the sacrifice, the suffering, the physical and mental torture those men endured. The true reason cannot ever be limned in words. To attempt it is vanity; but here is an attempt:

The explorer has always been a pioneer in humanity's everlasting crusade for knowledge. That the chalice he retrieves may hold but dregs is ever of little moment. His passionate search

goes on. Blindly, undaunted, he toils and suffers and dies that one more sentence may be scribed upon the tablet of mankind's cosmic knowledge. And then a century, ten perhaps, will pass before that sentence can be allocated in the total paragraph. . . .

This new scheme to fly across the Pole is one of the first items of allocation. That is to say, the profit that shall ultimately accrue from polar aviation quite properly belongs to that long line of courageous mariners who undeviatingly persisted in their valiant campaign against the sealed mysteries of the arctic. When bluff old Sir John Franklin vanished with two of His Majesty's finest vessels and eight-score British seamen the Empire cried its resentment around the world. Such waste of lives, of money, of property and prestige! Such absurdity, such foolhardiness, to seek to penetrate so bleak a region where man could obviously never live nor find the slightest reason for even again visiting And yet the scenes of Franklin's tragedy shall unquestionably be once more the scenes of man's activity: indeed, he left to us the charted positions of the most logical landing fields and the best protected refuelling stations in the American Archipelago!

When Kane and Peary spent the people's money public wrath arose against such squandering. Both recount the pain of personal attacks based on their supposed nefarious schemes to exploit personal fame at the expense of wholly disinterested taxpayers. "What is the sense of it? Why don't you stay home and be comfortable? How can anyone ever be benefited by such ridiculously misdirected zeal?" There was justice in these questions. The generation that lived and asked them saw Kane return a scurvy-eaten wreck, the bones of his ship left bleaching on the ice-foot north of Etah, the bodies of his men in nearby cairns; saw Peary come back crippled by loss of all his toes, his Eskimos as well as white men having died a thousand miles beyond the tree line.

Only now the dividends begin to come. For the way that Kane and Peary opened to the north is the way to the northern tip of Grant Land. And Grant Land, which lies just west of Greenland, is exactly half the traverse between London and Pekin. And the first commercial company that lays down a permanent schedule between those great centers of civilization shall begin

its plans by hauling out old diaries which were written in the igloo's flickering candlelight, temperature minus sixty, by men who toiled and suffered and died, blindly and undaunted, that one more sentence might be added to our knowledge of the globe.

Polar aeronautics began in 1897 when Dr. S. A. Andree conceived the idea of drifting across the Pole in a balloon. He established headquarters in Spitzbergen and built a large shed for the protection of his gas bag. His whole equipment was pathetically like that of a parachute jumper at a county fair. His only means of locomotion was the capricious wind. His rudder was nothing more than a long rope dragging on the ice. His chances for escape, should the balloon for any reason fail, were assured by a polar traveling outfit that wouldn't have filled a fair-sized steamer trunk. But his faith in his success was superb. "For," said he, "success to me consists not of a safe return; or even a sight of the northern axis. Success or failure must I measure by the information, no matter how intangible and small, that I shall add to what we know already about the arctic regions!" With this sublime faith he sailed away. We have of his balloon a last few photographs as it disappeared out over the dreary waste of ice. He never returned. Once, ten years later, an Eskimo from above the Coppermine River passed along a tale about discovering some strange thin fabric, cord, a few tools of white men. Brave Andree's balloon, perhaps. That was all.

Walter Wellman was the next polar airman. In 1907 he succeeded by indefatigable exertions in anchoring his amateurish dirigible on the Spitzbergen shore not far from Andree's site. This motor-driven machine was a vast advance over the little bulbous drifter of his predecessor. In America it had proved a tractable beast. Even in the arctic it gave great promise of success. But Spitzbergen is far from home. It lies within the eighty-second parallel of latitude. It groans beneath eternal ice and snow. Its night is the months-long darkness of the polar regions. Its day is a treacherous incandescence, a fact which escaped even the astute Wellman. He watched the sun swing around through twenty-four hours while myriad sea-birds made the black cliffs echo with their din. He watched the white flocks drifting gently in the summer tides. All was calm and white and shining, the deadly tranquility of arctic summer. Deadly

because one never knows at what instant the swirling rush of a summer blizzard shall sweep in a blinding torrent from the ice-cap. Deadly because, when the blizzard comes, man's most ingenious machines are but puny toys in its fearful grip. Wellman started. The blizzard came—unheralded. And the dirigible in blind helplessness drove its tender nose to destruction against the flinty face of a thousand-foot glacial precipice. Wellman was beaten. But he was not lost. And while the sublimity of his purpose as well as the skill and zeal of his endeavor were fully



FOULKE FIORD

The great fords debouching into polar waters will provide ideal conditions for hopping off or landing.

equal to André's, his Yankee spirit saved him. "Tough," he commented. "Tough as hell!" And that was all.

Then Stefansson lost himself. At least in 1914 he penetrated so far across the top of America and stayed away so long that men who understood such work said he never could come back alive. Admiral Peary, co-operating with the Aerial League of America, suggested a rescue by plane. A search was projected wherein a series of flights would be made from promontories along the shores of the Polar Sea. The risk would be desperate because aviation in those days was not the dependable loco-

tion that it is today. But since arctic work always involves desperate risks that side of the question was not of great concern. However, the venture never came to a head. Stefansson returned, as he always does.

But Peary was not satisfied. An explorer to the core, he still felt a peculiar humiliation in man's ignorance about the arctic. He saw there the greatest unexplored area of the earth's surface: a wide ice-hidden sea 2,000 miles in diameter. What lands and peoples, what wealth, what curiously valuable information might it not contain? The old itch was on his soul; he could not resist. His whip-hand took to the pen. With his usual industry he set about publishing at every opportunity the great surviving riddle of the north: *What will the birdman find in that vast white wilderness as yet untrod by man?*

Captain "Bob" Bartlett was about to command a relief ship for the expedition of which the writer was a member. At Peary's suggestion and with the aid of aviation experts he laid down the most practicable routes for mapping unexplored polar areas from the air. At the same time Amundsen, discoverer of the South Pole, initiated his plans for a drift across the Polar Sea starting somewhere to the westward of Alaska. He brought his interest and experience into co-ordination with Peary, Bartlett, and the others. Finally the long-delayed exploration which for centuries men had carried creepingly with dogs and sledges was completed for the aviator in paper form at least. But war intervened. Fortunately too, because development in the science of flying leaped forward with a speed that only the stimulant of man's desire to kill could bring. Peary died. Bartlett's plans were held up. Amundsen alone actually got away. At the moment of writing he alone is north, somewhere with his little ship, his plane, his indomitable will, along the northern edge of Alaska. Andrée's balloon Wellman's dirigible Amundsen's plane Long years between. Slowly the fight goes on—

Eventually man will win this fight. Man eventually wins every fight. As usual there is plenty of sentimental interest in the way he has fought. Indeed few struggles in the history of the race have been so vividly enthralling as that for the Pole. But such interest is only passing. Of vital import, of pressing import almost, is:

How will the United States be affected should polar aviation become a common occurrence?

As in most questions of world economics the answer is both commercial and military.

On the commercial side statistical figures are significant. For example, federal reports show that in one year we exported to Japan \$453,147,063 worth of merchandise. In the same year we shipped to Scandinavian countries \$359,682,949 worth. It would savor of soap-box oratory to claim that if the distance from Christiania to Nagasaki were cut in half by a North Pole route—which it would be—the United States would immediately be short-circuited. Yet that certainly is the indication. It would be gross exaggeration to declare that we should lose a billion-dollar trade if Japan and Scandinavia began to supply each other with what we supply both of them today. Yet sure as sunrise we should lose. It would be absurd to suppose that these antipodes would ever prefer a trade-route clear of marts so lucrative as ours. Yet northern marts are growing even now.

A large percentage of those huge sums is freight. Freight sent 10,000 miles by ship and rail as it is today from Europe to the Orient around the world may well tomorrow cost tremendously less when sent but 5,000 miles across the Pole by dirigible. And even a one per cent saving on a billion dollars is no mean gain: \$10,000,000 in fact.

Pursue this line of thought to other countries and other activities. Canada and Siberia with their growing railroads are potential Roman Empires. Their future is not of posterity either, but of tomorrow. Stefansson has convinced the Canadian Government that its resources are open clear to the Polar Sea. Only the other day a deposit estimated at 32,000,000 tons of excellent coal was discovered in Saskatchewan. Oil fields are being developed within the arctic circle. Both these vast commercial nations lie dormant. They are just being populated. They are above the latitudes of intensest commerce. But give them an open road across the top of the earth and a cataract of trade must start.

Diversion of passenger service would be even more certain. Of course tourists and tradesmen would never cease to visit the States any more than they have ceased to visit the modern sur-

vivors of ancient Mediterranean civilizations. But the business warrior is a practical man. He is not going to travel from New York to Chicago by way of Niagara Falls after his honeymoon visit. He is going direct. Minutes and miles mean dollars to him. And enough minutes and miles are going to be saved in 1935 by a polar route from Europe to Asia to pay off our national debt!

The military facts are even more simply portentious. Safety, any military man will tell you, lies for the individual as well as



GREENLAND

Most northern coasts denuded by recent glacial action offer only small areas fit for landing fields.

the nation in logistics. Logistics may be defined as that part of military activity outside the actual fighting. The backbone of logistics is communication. The nation which can communicate wholly and successfully with its allies has a tremendous and almost insuperable advantage. The belligerent that can keep open its lines of supplies can usually fight on indefinitely. Germany almost won the war by cutting sea-borne communications between England and the world. The Allies did win the war that way.

In war between the United States and any European or Asiatic

power the polar air route must come to play a conspicuous part. We can blockade the seas. Sea travel is slow and must move to and fro over more or less definite lines. Ocean search curves are mathematically successful always. But air travel is swift and cunning; it is superbly effective when there is dodging to be done. We should be removed from the main line of our enemy's communications. We should, broadly speaking, find ourselves flanked by enemies even as Germany was; only more so. For Germany all but severed the threads that bound the eastern and western fronts. Could we, in the same way, cut a myriad possible routes across the arctic waste—an area the size of an entire continent? Scarcely.

It is a matter of sadness to anticipate such things. The man who once has learned with intimacy what war is hopes with prayerful heart never to see war again. Yet the world is not yet done with war. To deny this is to invite disaster. To deny the possibility of our ever defending our commerce or our honor against the predatory interests that already threaten both east and west is to play the silly ostrich. So we must meet the strategic meaning of a polar air route as we met that of the Panama Canal: A military problem involving our future safety.

Alaska, of course, will be the scene of our new arctic activities. We shall have a new breed of warriors in the shape of Vikings of the Air, together with their water-borne tenders on the fringes of the ice-pack. We shall automatically develop the latent resources of the country. Coal there now costs twice as much as it does at home. But helium for dirigibles can be manufactured as cheaply at the mine's mouth north as it is in Texas. Spruce and fabric for innumerable planes are indigenous. Huge caribou herds bespeak an inexhaustible commissary.

Contrary to rumor the climate bogey is not going to prove any sort of impediment to arctic aviation. Popular opinion pictures the Polar Sea as a wilderness of elemental violence. From a scenic point of view this is true. Its area of ice-pack from forty to over a hundred feet thick is nearly as large as the United States. Its winter cold and darkness are inhuman. Its tide-jams crash and roar with each shift of current or wind. But these stage properties will never amount to real obstacles for the modern aircraft.

The flying season inside the Arctic Circle will for some years be between June and September. For five weeks in that period the actual heat per square mile received in those regions from the sun is greater than at the equator. This is due of course to the fact that the sun is working twenty-four hours a day up there. The temperature is amazingly unchanging and averages between thirty and forty degrees F. In Alaska 100 degrees in the shade has been recorded in July. Only constant evaporation on the ice-fields by absorbing heat prevents polar temperatures from



EGEDES MINDE

Danish colonies in Greenland typify the future circum-polar aviation station.

rising equally high. Sea water in the arctic never gets colder than twenty-nine degrees F. This fact holds the year around. In consequence during winter when a tide crack opens and lets air at sixty-five degrees reach the tremendously warmer water black vapor arises like smoke from a cauldron. As no great land masses exist in this ice-filled sea there can be no erratic movements of the atmosphere. Even the violent winter winds are only surface movements.

Specific dangers incident to all flying will be tremendously

reduced. Polar floes are pitted and seamed with titanic pressure ridges, bergs, and other pseudo-volcanic evidences of tidal violence. But the very forces that cause these eruptions also insure that there be vast areas of absolute levelness. For every time the field is sundered bitter cold at once congeals the water thus exposed and forms a runway scores of fathoms wide and five to fifty miles in length. These runways in summer will be ideal landing places for the aviator in distress. Likewise pits of pressure fill with water under the unsetting sun in summer and form lakes convenient for any crippled sea-plane.

A transoceanic hop between the continents approaches 2,000 miles. With a pair of dividers one can see that something close to 800 miles will be the maximum traverse between circum-polar stations. When an ocean flyer falls he's safe enough—that is, provided the sea is smooth and he has a large supply of food and is fortunate enough to be picked up in the brief interval between dawn and sunset. On the Polar Sea the ship-wrecked air-mariner will alight upon or by a solid floe. He will not be at the mercy of each wind and tide that runs. He will not be careening across an empty waste of ugly seas. On the contrary he will be almost unmoving save for the slight idle drift of the pack. For twenty-four hours a day he may send a signal column of black smoke into the sunlit heavens. Rescue will be simple, sure, and devoid of any hardship.

Colonial geography will alter vividly. Down the Mackenzie to the sea, up the Lena to its sources, will swarm a new and hardier race of pioneers. The Mississippi and the Rhine were set athwartships to advance of civilization. Great rivers of the north are parallel: they will be like lubricants to a people's movement.

Our rich northwest will become richer. Slower than the Klondike rush but tremendously fuller and more permanent will swell the urge to competition with our European friends who shall have joined hands across the Pole. Alaska will be the scene of a new empire. We have relinquished our hard-won Greenland interests to Denmark. Britain claims her Canadian boundaries clear to the Pole itself. So alone remains Alaska as our gateway to this new field of transportation.

It all seems a little far-fetched. So did aviation in 1905. Only with an effort can we shrug away the shuddering memories

of the north we read about in childhood and picture that fearful desert thronged with caravans of the air. But that is always the way with progress. Caesar pushing up into islands that are England won the caustic comment: "Only a lunatic would contemplate a victory in a land so distant from the Mediterranean."

With radio and planes the Pole is this year fifty times as close to us as London was to Rome.

WE MUST HAVE IT!

BY LIEUTENANT COMMANDER F. S. CRAVEN, U. S. NAVY

IT IS known that several efforts have been made in recent years toward the establishment of a Gunnery School for the Navy.

Some of its proponents have been influential officers in important official positions; yet we have no school. The present writer therefore does not expect much tangible result from this article. He hopes merely to keep the subject alive—perhaps to give it aspects not fully covered previously—thus to assist in crystallizing favorable service sentiment into a service determination to secure the establishment of the school.

It seems probable that the service has not realized the imperative necessity for the school because the whole extent of its functions has not been perceived. It is not at first apparent that almost all of our gunnery evils, not only of personnel and of method, but of material, would be corrected simply and naturally through its operation. For instance, we all know of cases of defective design of equipment. Some are defects in basic theory; others in details. Not many of these could have occurred had the Gunnery School been in operation. We know of cases where costly equipment has been damaged through ignorance of its use or upkeep. These could not have occurred with a trained personnel. We have seen ships excellently equipped make miserable failures at target practice, discouraging their enlisted personnel and throwing unwarranted discredit on their equipment. The school would have done much to prevent such occurrences. Finally, we know that gunnery knowledge in the service, particularly on the smaller ships, is unrelated, fragmentary, frequently defective, and sometimes non-existent. This is largely due to placing inexperienced and untrained officers in active control of equipment which they do not understand, and facing them with highly developed gunnery problems when they are yet ignorant of the basic principles. The last is the popularly supposed reason for

wanting a Gunnery School; but the others are of equal or greater importance. The writer will attempt to show why.

At present we train gunnery personnel in the school of experience. Most observers will admit that experience is an excellent teacher; but it has its disadvantages from a naval standpoint. Perhaps the most serious one is the length of time usually required to learn by that method. Thus, most of those actively engaged in gunnery are in the process of education. What they have learned is often not well balanced, because experience presents its lessons without regard to logical sequence.

Experience is a versatile teacher, adapting its lessons to the characteristics of the student. There is an advantage here, from the viewpoint of the individual, but from the service standpoint there is the vital disadvantage that divergent views grow up. It becomes difficult to develop an accepted basis upon which to premise the training of newcomers. It often happens, also, that those who have acquired knowledge through experience either are not able to impart it to others, or else fail to recognize the essential difference between a code of procedure, like ritual in religion, and basic principles, and so lay stress on details which mean nothing by themselves. Therein often lies the defect in such gunnery instruction as is given by individuals to individuals.

It would be wrong to suggest that effort is not made in the Navy to give a general education in gunnery. On the contrary, there is an immense literature on the subject. There are well prepared standard publications dealing with its various phases. Each year's gunnery experiences are printed and issued to the service. The trouble is that we do not profit from these things. The yearly lot of new writings cannot safely be co-ordinated and edited in the Office of Gunnery Exercises because, although the personnel of that office is selected, they nevertheless are detached from active gunnery, and so cannot test theories directly. They could only, like a jury, attempt to reach a conclusion through sifting opinions, with their own experience as a basis for comparison. Were they to edit the gunnery reports they would be adopting a method which has already led our Navy into serious errors in recent years: namely, the vitally defective method of development through the consensus of opinion, instead of through experiments and tests.

The present system might well be worse than it is, yet we must not be blinded to the fact that it can be greatly improved. The yearly reports, for instance, generally refer to special phases which interested the respective writers, but are not likely to knit in well with the theory held by more than a portion of the personnel engaged in gunnery. Where they do not knit in they are likely to be fought against, as tending to disrupt the development of the theory in which the individual is interested. Where they do knit in there is the danger that some fundamental fault in principle is perhaps being strengthened and perpetuated. They are so diverse and fragmentary that they are poor means for educating novices.

Of course certain sound principles and methods are generally recognized and used, and can be published safely. The existing standard publications contain most of these; but they too are imperfect means for education, partly because there is no consistent pressure to force the personnel to study and apply them, and partly because they admittedly contain only that which is well recognized and developed through experience. Therefore they do not include the more recent developments of modern gunnery.

As stated earlier, we have made many serious mistakes through dependence on the reports of boards or on the so-called consensus of opinion. For certain large and abstract problems which can be tested only in war, the considered opinion of a group of trained minds seems at present the best solution. But these minds constitute a permanent organization for planning—a "plans section"—and must not be confused with a board, as we understand and apply boards, nor with the consensus of opinion. Our boards usually are transient gatherings of officers who have other permanent duties elsewhere which they must neglect. They investigate superficially, consider hurriedly, and conclude hastily. Mistakes in principle as well as in detail are bound to occur, and do occur. The consensus of opinion in its best form is where an individual first prepares a plan which is issued for advance consideration. Then a conference is called for discussion, after which the best opinion is sought after, generally by the individual who prepared the original plan. If the controlling individual is absolutely impartial in reaching his final con-

clusions, and is not unduly influenced by the rank or personality of the debaters, this procedure probably would produce close to the best available opinion. But after all, it is purely opinion, and what does opinion prove? In any conference concrete things necessarily are absent, or if not—if the conference is held on the “job”—the consideration of the concrete is limited and hasty. Parts, whether of mechanisms or of methods, cannot be shaped and fitted to work properly together, as they can be when the development is by trial and experiment. And so, almost always, the result of the consensus is crude and imperfect, and often it is downright defective. We cannot permit the development of fighting means by such imperfect processes as these when it is possible instead to develop them through experiment and test. The Gunnery School would provide the means, and the test would be conclusive because made at full size under service conditions.

Another serious fault in our present method of material development is a periodic tendency toward alteration in gunnery theory. There is a similar and even more marked tendency in design theory. These variations occur because for two or three years a theory is developed by one man, or a group dominated by one man, and when this man takes up new duties (in accordance with our fixed policy of periodic changes of duty), the theory is apt to be modified or discarded to suit the ideas of his successor. There is a complementary fault in that there may be representatives of radically different views contemporaneously controlling interdependent elements of the organization for producing material, with consequent conflicts, and lack of harmonious and consistent development. These faults exist because there is no permanent organization interposed between the shifting individuals endowed with executive as well as with planning functions, who control our gunnery, and the service. The Gunnery School would serve this purpose, acting as a fly wheel to store up momentum from the outgoing régime which the incoming could not dissipate before they had had sufficient experience in their new jobs to avoid expensive mistakes. Of course the head, and the principal members of the staff, of the Gunnery School would have to be shifted occasionally, but this need not produce a lack of permanence because shifts could be

staggered, as in the U. S. Senate, and the organization would be too large for one individual to send it off on a tangent.

Before leaving the subject of material, give consideration to the wisdom of permitting experience to teach the procedure for upkeep. This practice costs us untold dollars each year. We place costly devices on ships and expect untrained officers and men to maintain them. It is true that we furnish excellent pamphlets (yet generally not so good as the British!) covering maintenance, but we forget that many otehrwise intelligent persons are not able to derive really effective information from books alone—they require guidance and instruction. Nor can we count on the application of sufficient pressure to ensure attention to such pamphlets, except on a few ships. What we require is instruction of the officers and of the upkeep personnel. This instruction would form a natural part of the work of the Gunnery School, and our existing Torpedo and Ordnance Schools would be absorbed by it. The existence of these schools was not overlooked in the discussion of the earlier part of this paragraph; they simply cover only part of the material and reach only a small portion of the necessary personnel.

To summarize: Our present method of gunnery development prevents the growth of a logical system. It produces unsatisfactory results which in turn generate a cynical attitude among the personnel. It prevents thorough development of details of design. It is frightfully expensive in money because of the numerous detached experiments which each new régime initiates, and because of the natural tendency to discard developments of the preceding régime; also, because of the injury and waste caused by untrained personnel learning by experience. It is the system that has caused us to be so backward in material development that Admiral Fiske and others have felt justified in telling us that we have been years behind other navies. In short, it appears that we are not employing our intelligence in developing the gunnery of the Navy. We are trying to work a system which will function after a fashion, but only through the application of much force which is expended chiefly in internal friction. It is a system which has produced mediocre results and can produce none else. Mediocrity opposed to excellence is sure defeat in modern war!

We have a large commissioned personnel of undoubtedly good mental quality. It contains the usual types of men, including those who are specially fitted to instruct and those who are peculiarly able to find out things by experiment. In the latter two classes are graduates of our school of experience, available now to make a start with the Gunnery School. We should select men of large enough perspective to give consideration to the suggestions of others. They should be supplied with modern equipment and with facilities for experiments. They would be stimulated in their development work by the eager interest of younger minds associated under them for instruction. Thus the school would soon thresh out the diverse crop of gunnery theories which our present system has produced. Through convincing demonstration the school would reveal unsound theories and develop good ones. Education by demonstration would nevertheless require the development of simple manuals for recording the principles and methods of gunnery for the student to take with him, and these would be kept up-to-date automatically, through the normal progress of the school. The school would naturally become the test laboratory for the fleet; the clearing house for new ideas.

To render the conception a concrete reality we should have the use of a large ship, such as an Army transport, to house the student body and to accommodate the experimental laboratory—for we should have to move the school to find the weather and other conditions which would be wanted from time to time. Then we should have also one or more vessels of the principal types, for demonstration purposes.

The chief problem, from a financial standpoint, would lie in the necessity for increasing both the commissioned and enlisted personnel of the Navy, in order to man the existing fleet and at the same time to provide the personnel for the school. About ninety per cent of the younger commissioned personnel should go through the school—say about forty per cent of the present personnel—and all of the future entrants in the lower grades. Although perhaps at first the instruction should be on a wider basis in order to catch up with the needs of the service, it is probable that ultimately the students would be confined to the grade of junior lieutenant, which is gone through in three years. The course of instruction would not require over six months;

therefore about one-sixth of the junior lieutenants, which would be about two per cent of the whole line, would be at school at all times. A smaller percentage of enlisted personnel would be required to receive instruction, but additional men would be needed to man the vessels constituting the school.

At the start the school would be a modest affair. It would be on trial. But it very soon would establish its obvious merit, and its value to the Navy would ensure its growth. The direct savings due to improved designs and to the education of the personnel in upkeep measures, combined with the indirect but probably larger savings due to a consistent gunnery system, and the avoidance of costly mistakes produced in bulk, would soon pay many times over for the school. It would be quite impossible to evaluate the increased gunnery efficiency of the Navy, which would be the greatest gain.

The school should have close tactical affiliations with the fleet, because the development of gunnery depends on tactics, and vice versa. This would come about naturally, as the school gradually absorbed the correcting of material defects. Relieved of this worry, the fleet would come to devote its attention largely to the relations of gunnery and tactics, and to gunnery principles. The school naturally would be a recipient of target practice reports. In fact, it probably would absorb many of the duties of the Office of Gunnery Exercises. The latter also would be freed of worries, as regards details, and thus would be able to devote most of its attention to moulding development along lines consistent with the war plans, and to taking full advantage of intelligence reports from abroad. To complete the picture, the school would serve as trial horse for developing the flaws in proposed forms of gunnery exercise, and, incidentally, for simplifying the paper work required in making reports, through having to apply it to actual cases.

And after all, we would still have experience working for us, with all its advantages intensified and its drawbacks removed. We would have provided it with a foundation of well disseminated fundamental principles upon which to build, and the structure would then grow along simple and effective battle lines.

AMERICAN MARINES IN THE REVOLUTION

BY MAJOR EDWIN N. MCCLELLAN, U. S. MARINE CORPS

“**A**T NO period of the naval history of the world, is it probable that Marines were more important than during the War of the Revolution,” wrote J. Fenimore Cooper, and “the history of the Navy, even at that early day, as well as in these later times, abounds with instances of the gallantry and self-devotion of this body of soldiers.”

The first blood of the American Revolution was shed at Lexington on April 19, 1775. After Ticonderoga had been captured, on May 10, there was difficulty in holding it, and men and money were asked for. It is in connection with the resulting relief expedition that American Marines are first mentioned in our history. In the expedition, so goes the account, were sent “500*l* of money, escorted with eight Marines, well spirited and equipped.” Arriving at Albany, additional troops joined the expedition, which soon arrived at Ticonderoga, after passing through territory infested by hostile Indians and treacherous renegades.

The earliest Marines, as also the earliest ships, belonged to the State Navies; before there were any ships in the Continental Navy, thousands of Marines served on the State vessels. Some were attached to the *Katy* and *Washington*, of the Rhode Island Navy, when, on June 15, 1775, those warships chased ashore and destroyed an armed tender of the British Frigate *Rose*—the first enemy vessel captured by a public armed vessel during this war. The *Experiment*, launched on July 19, 1775, was the first vessel of the Pennsylvania Navy; South Carolina had vessels in commission by July, 1775; Connecticut and Massachusetts by August, 1775; and Virginia by December, 1775. The other States (except New Jersey and Delaware which had no Navies) acquired vessels on later dates.

Then on June 17 came Bunker Hill, and on July 3, George Washington assumed command of the Army around Boston. In addition, under orders of Congress he had “direction of the Naval

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Department" and well might be called the "Father of the American Navy."

On October 5, Congress directed General Washington to secure two armed vessels from Massachusetts, place them "on the Continental risque and pay" and use them to capture two unescorted brigs loaded with munitions that had sailed from England. He was also instructed to give orders for the "proper encouragement to the Marines and Seamen" that served on the vessels. This was the first time the Continental Congress ever mentioned "Marines." Washington soon gathered together a fleet from the Navies of the New England States. The vessels were manned by crews, including Marines, taken from his Army. Once on board, however, they belonged to the naval service, and in many instances there are references to the Marines serving on the *Hannah*, *Hancock*, *Lee*, *Lynch*, *Warren*, *Franklin*, *Harrison*, and *Washington*. The duty performed by these vessels had considerable effect in forcing the British to evacuate Boston on March 17, 1776, and thus the Marines shared in that success.

And so the American Marines of the State Navies and of Washington's Fleet, by their own acts, gradually established themselves in public favor. Congress became impressed with the fact that a corps of these Marines for the Continental Navy would be a fine thing.

There is a date that is celebrated every year by American Marines, wherever they are stationed throughout the world. It is November 10—the birthday of the Marine Corps. On that date, in 1775, Congress resolved: "That two Battalions of Marines be raised, consisting of one Colonel, two Lieutenant Colonels, two Majors, and other officers as usual in other regiments; and that they consist of an equal number of privates with other battalions; that particular care be taken, that no persons be appointed to office, or enlisted into said battalions, but such as are good seamen, or so acquainted with maritime affairs as to be able to serve to advantage by sea when required; that they be enlisted and commissioned to serve for and during the present war between Great Britain and the colonies, unless dismissed by order of Congress: that they be distinguished by the names of the first and second battalions of American Marines, and that they be considered as part of the number which the Continental Army before

Boston is ordered to consist of." At first the enlistment period was for the war; later this was changed to include the period up to January 1, 1777, and after that the enlistment was for a stated term.

Washington received with dismay the orders to supply the personnel for this corps of Marines, and informed Congress that to supply them would "break through the whole system" in his Army which had "cost us so much time, anxiety, and pains, to bring into any tolerable form." This was because the Marines "must be acquainted with maritime affairs," wrote Washington, and because he would have to pick the Marines "out of the whole Army, one from this corps, one from another." He recommended that the Marines be raised in New York and Philadelphia. At last Washington stated that an "insuperable obstruction" consisted in the impossibility of getting the men to enlist for the "continuance of the war." On December 14, General Washington wrote Congress, "I am at a loss to know whether I am to raise the two battalions of Marines here or not." Again, on January 4, 1776, he wrote: "Congress will think me a little remiss, I fear, when I inform them that I have done nothing yet toward raising the battalion of Marines." Washington had ample excuse for this reluctance and procrastination; for he had twenty-six incomplete regiments at this time in his Army. His views evidently prevailed, for Congress soon directed that the Marines be raised from a source other than from his Army.

All this time, however, the Continental Marines had been in existence, and were working out their own salvation. The reluctance of George Washington to give up sufficient personnel from his Army for the organization of the two battalions had no retarding effect upon the appointment of officers or the enlistment of Marines.

As events turned out the colonel, the two lieutenant-colonels, one of the Majors, and the staff were not appointed. The highest ranking officer of Marines serving during the Revolution was Major Samuel Nicholas, who after active service with Hopkins' Fleet, and in the Battles of Trenton and Princeton, performed duties at the Capital that corresponded more or less to those of the commandant today; and in addition acted, at one time, as muster master for the Navy.

The "First and Second Battalions of American Marines" were never actually organized and named as such. When the emergency or demand for the use of Marines arose, provisional units, from a squad to a battalion, were organized. When a vessel of the Navy went into commission a Marine Guard was formed and marched on board. When the object for which the provisional unit was organized had been accomplished, or a vessel no longer required a Marine Guard, the unit was disbanded and the officers and men used for other purposes.

These, however, were not the only Continental Marines. There were those who were appointed and enlisted in Europe, for the vessels of John Paul Jones' squadron, and other ships such as the *Boston*. Many of these Marines were French, and of other nationalities. In addition to these Continental or Federal Marines, there were the thousands serving on the privateers, who were sometimes called "Gentlemen Sailors" or "Gentlemen Volunteers." There were also those who were attached to vessels of the State Navies. And there were those who were detailed, from the Army, to act as Marines on particular occasions.

Marine officers received the same character of commissions as did the Army and Navy officers. Samuel Nicholas was the "oldest officer of Marines." He "entered into the service in the capacity of a Captain of Marines" (being commissioned as such on November 28, 1775) and probably received the first commission in the Continental naval service, known of today.

The methods and plans of recruiting Marines were very little different from those used today. Offers of prize-money, advance money, expense money, bounty money, pensions, and promises of ample grog rations, were the lures presented to those who were in a "recruiting mood." Handbills were used extensively to make public the recruiting propaganda. Attractively uniformed recruiting parties, preceded by drum, fife, and colors, noised their way up and down the streets of the cities and large towns and ended up at a rendezvous with a queue of patriots who thus early obeyed the command to "Join the Marines."

Benjamin Franklin wrote that in 1775 he had observed in Philadelphia on one of the drums belonging to the Marines—whose recruiters were raising two battalions—"there was painted the rattlesnake with this motto under it, 'Don't tread on me!'"

He said, knowing it was the custom to have some device on the Arms of every country, that he supposed this design was intended for the Arms of North America. It is claimed by many that this device of the Marines was on the first flag that flew from the mastheads of our first ships of war.

Philadelphia was the leading Marine Corps recruiting city of the United States, and probably the most famous of all recruiting rendezvous established during the Revolution was that located in the Tun Tavern in Philadelphia. This was a once prominent hostelry on the east side of King (Water) Street, at the corner of a small thoroughfare known as Wilcox's (later as Tun) Alley, that led down to the Delaware River. Captain Robert Mullen, proprietor of the tavern, was captain of a company of Marines.

Marine officers were also used extensively for recruiting personnel for the Navy. For example, Captains Matthew Parke, Edward Arrowsmith and Second Lieutenant Samuel Wallingford of the Marines, under the direction of John Paul Jones, assisted in recruiting the crew of the *Ranger* in the late summer of 1777; and the crew of the *Providence* at Plymouth, Mass., in 1776, was another instance.

Marines performed all sorts of duty. With necessary officers they were detached for service on board the armed vessels of the United States, and thus engaged in every important battle afloat; participated in important landing parties from naval vessels, such as the one at New Providence (Bahamas) in 1776; at Whitehaven (England); at St. Mary's Isle (Kirkcudbright, Scotland); and again at New Providence in 1778; were ordered to do duty in forts, such as Fort Montgomery in New York; performed expeditionary duty, such as the Penobscot Expedition in 1779, and the expedition down the Mississippi to the Gulf of Mexico on the *Rattletrap* at an earlier date; were detached for service with the Army during the period when they fought at Trenton and Princeton; performed artillery duty with the Army; guarded enemy prisoners; acted as guards at naval stations ashore; went to the Indian-infested forests of Pennsylvania, and brought out masts for the frigates of the Navy; and acted as officer-couriers and Continental Express Riders in America and Europe.

The principal duty, of course, was service on board the ships of the Navy. The strength of the Marine Guards varied considerably. The thumb rule which determined the strength was that there should be one Marine for each gun on the ship, but this rule had many exceptions. The frigates carried about sixty Marines but the duties expected of the various ships frequently caused a considerable increase in the strength of the Marine Guard. Boarding and repelling boarders and the close range at which naval battles were fought made the musketry fire of the Marines an important element of combat.

On board the Privateers, the Marine was a very high type of man and fighting was his only duty. When the United States Schooner *Revenge* was captured and later laid up at Portsmouth Prison in England, one of the "Gentlemen Sailors" of that vessel was discovered to be a woman.

The duties of the Marines on board ship consisted of sentry duty at important posts throughout the ship, and during action, they were often stationed in the tops, where the expert shots were of great assistance. Cooper wrote that the Marines were "strictly infantry soldiers" who were "trained to serve afloat; and their discipline, equipments, spirit, character, and *esprit de corps*, are altogether those of an Army. The Marines impart to a ship of war, in a great degree, its high military character. They furnish all the guards and sentinels; in battle they repel, or cover the assaults of boarders; and at all times they sustain and protect the stern and necessary discipline of a ship by their organization, distinctive character, training, and we might add, nature." While the Marines at times manned the great guns, "their proper weapons" were "the musket and bayonet."

Green was the dominant color of the Continental Marines' uniform during the Revolution. An officer wore a green coat with white facings and skirts turned back. The coat had slashed sleeves and pockets and had buttons around the cuffs. A silver epaulette was worn on the right shoulder. The waistcoat was of white material. The breeches were white, edged with green. Black gaiters and garters were part of the uniform. The buttons were of silver and carried a foul anchor. A sword and other necessary equipment were carried.

The "regimentals" of the enlisted man consisted of a green

coat faced with red, a green shirt, a white woolen jacket, light colored cloth breeches, woolen stockings, and a round hat with white binding. His buttons were of pewter and carried a foul anchor. While in European waters, John Paul Jones dressed his Marines in the English uniform—red and white, instead of the green as prescribed by the Marine Committee. The Marines of each State Navy also wore distinctive uniforms.

Congress prescribed the rates of pay for the officers while the pay of the enlisted men was the same as the Army. A captain of Marines received thirty dollars a month; a lieutenant twenty dollars; sergeants eight dollars; the corporals, drummers and fifers, seven dollars and one-third; and the privates six dollars and two-thirds.

Congress carefully prescribed that the Marines would share equally in all prize money and accorded them the same rights with regard to pensions as provided for the Army and Navy. The Marines of the State Navies were also treated generously in regard to pay, prize-money, and pensions.

At the termination of the struggle the Marine Corps, like the Army and Navy, was disbanded, "literally leaving nothing behind it," as J. Fenimore Cooper most appropriately stated, "but the recollections of its services and sufferings."

(COMMANDER H. S. BABBITT, 23 January, 1923)

Assumptions { A. Vacancies to be selected for each year to be as indicated under the respective dates.
B. Casualties (death, resignations, retirements other than by age in grade) to be 3% per year.

[illegible]

A PROPOSED MODIFICATION, AND A PROPOSED PALLIATIVE, FOR THE PERSONNEL SELECTION LAW

BY COMMANDER H. S. BABBITT, U. S. NAVY

REFERRING to Commander McCain's instructive article, "A Personnel Survey," in the January, 1923, *Proceedings*, it is to be noted that he estimates the vacancies for promotions from captain to rear admiral as follows for the next few years:

Fiscal year ending	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	there- after annu- ally
Estimated vacancies.....	4	8	6	6	10	3	5	9	6	8	7	9

Taking the average casualties (deaths, resignations, retirements other than by age in grade) in captains' list as three per cent per year, it is found that in seventeen years the total casualties will have mounted to 51 per cent; and that hence seventeen years from now, i. e., in 1940, a number (9 say) of then surviving captains will represent what is left of approximately twice as many (eighteen in this case) of the numbers on present officers' list. To give a number x surviving captains after any other assumed y number of elapsed years, there should be taken $\frac{100x}{(100-3y)}$ of the numbers now on the officers' list. Proceeding thus with Commander McCain's estimated vacancies, the following table is obtained:

Fiscal year beginning	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Estimated vacancies.....	4	8	6	6	10	3	5	9	6	8	7	9	9	9	9	9	9	9	9	9
Casualties for same.....	0	0	1	1	2	0	1	3	2	4	4	4	5	6	7	8	9	10	11	12
Number of officers of present list to be considered	4	8	7	7	12	3	6	12	8	12	11	13	14	15	16	17	18	19	20	21

Applying the lower line of numbers from this table to the present list of captains and commanders (January, 1922, *Register*), excluding extra numbers, Chart 1 herewith is obtained. Chart 2 is similar table for commanders to captain, but calculated on a

EXPLANATORY NOTES.

1. The numbers down to the lower (dot and dash straight) line include what will be approx. the remaining 15 senior numbers each year.
2. The numbers above the upper (dotted ladder) line approx., will have already been promoted, if by seniority; i. e., this line will be approx. top of list, if none have been passed over.
3. The medial (vibrating solid) line represents approx. lower limit of selections each year, if by seniority; if otherwise, selections should go lower.
4. The asterisks indicate numbers which will reach age of 56 during that succeeding fiscal year.
5. All numbers as per January 1922 register; extra numbers are omitted.

EXAMPLE I.

- (a) The first 15 numbers on the captain's list on 1 July, 1930, will probably be included in the present numbers as shown under 1 July, 1930; i. e., in the numbers 126*, 135*, 138, 142, 144, 145*, 147*, 153, 154, 155, 156*, 158*, 161, 162, 163, 164, 165, 166, 167*, 168*, 170, 171, 173, 174.
- (b) Of these, those above the upper (dotted) ladder line, i. e., 126*, 135, 138,—should have already previously been promoted, if by seniority; the nearest remaining numbers just below the upper dotted ladder line, i. e., 142, 144, or 145*—will therefore be the approx. top of list.
- (c) It is estimated there will be 9 vacancies during year following 1 July, 1930; and that only 79% of those now on list will then remain; 9 is approx. 79% of 12; these selections of the July 1930 board will therefore extend through approx. 12 of the present numbers, and hence down to approx. the medial (vibrating, solid) line,—provided selections are by seniority; if selections otherwise, they will extend further.

- (d) All the numbers marked with asterisks in the 1930 column will reach age of 56 during that succeeding fiscal year; and those numbers below the lower straight dot and dash line are numbers below the surviving senior approx. 15, which will also reach age of 56.
- (e) Only approx. 79% of those shown in the 1930 column will then still be on list, with normal casualties, etc.

EXAMPLE 2.

- (a) Number 164 will be near the lower limit of selections (just under the medial solid line) of the July 1930 board, if these are by seniority; if the selections are not by seniority, he will be above the lower limit of the selections.
- (b) If remaining on the captains' list in 1931, No. 164 should be approx. at top of same.
- (c) No. 164 should make his number as rear admiral in approx. the spring or summer of 1931; and the asterisk there indicates he will reach age of 56 during the fiscal year beginning 1 July 1931.

CONCLUSIONS.

- (a) Those numbers above the upper dotted ladder line have a chance to be within a number of seniors equal to the number of selections, for at least 2 years and sometimes for three; they are particularly advantageously placed,—as regards seniority position and otherwise.
- (b) The numbers above the medial solid line are well situated for selection; while those below this line are less favorably situated.
- (c) The numbers below the straight dot and dash line have but slight chance of selection, unless the board does considerable "reaching" and many are passed over.

basis of 2 per cent casualties per year $\frac{100x}{(100-2y)}$ and hence with numbers as follows:

Fiscal year <i>beginning</i>	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Estimated vacancies.....	14	23	26	32	25	15	26	19	30	36	22	41	41
Casualties for vacancies.....	0	1	1	2	2	2	3	4	6	8	9	12	14
Number of officers of present list to be considered.....	14	24	27	34	27	17	29	23	36	44	31	53	55

From Charts 1 and 2 thus constructed may be clearly seen what difficulties in choices will confront the Selection Boards within a few years; and this is particularly evidenced in the captains' lists (Chart 1). Considering the latter, beginning with 1929 there will be more forced retirements than selections; and this preponderance will continually mount each succeeding year thereafter, certainly for the subsequent ten years at least (1929-39 inclusive).

This means that either many officers (near and below the lower straight dot-and-dash line) will have to be retired in grade without having had more than a bare chance of selection, if the present elimination of selection by seniority should continue; or that a continually mounting number (around and above the medial vibrating solid line) will have to be passed over each year, if a more extended selection through a greater range should later be reached; or—and probably—it means both. The result will be that the top of the list will then include many officers who have been passed over, and who are marking time (literally) somewhat resentfully, waiting for their age in grade to be reached; and that the lower part of the list will include many officers who are likewise marking time—rather hopelessly on account of their unfavorable position—also waiting for their age in grade to be reached.

Both these features are objectionable. The continued retention in active service, until they later reach the age of forced retirement, of officers who have been passed over, is embarrassing and awkward to the latter and to those selected alike, as regards their subsequent service relations. The forced remaining in active service, possibly simply waiting for the retirement age to arrive, of those with but slight chance (by reason of their

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unfavorable position on the list, or on other account) of selection, is likewise not conducive to greatest efficiency; and it may also tend to work individual hardships on some of such officers. The following are offered as respectively a proposed modification of the present law to eliminate the former feature, and a proposed additional act as a palliative to the latter feature.

PROPOSED MODIFICATION IN PRESENT ACT

(1.) "Any officer who is passed over in the selections by a Selective Board convened and operating as prescribed under this Act, shall, upon approval of such selections by the President, be at once detached from active service, and be retired, irrespective of age, with pay of two and one-half per centum, per annum of service, of his last total pay on the active list."

PROPOSED ADDITIONAL PALLIATIVE ACT

(2.) "Any officer who shall have completed ten years service in the grade of senior lieutenant or a higher grade inclusive, or who shall have completed twenty years total service, shall be permitted to retire upon his own application, within the discretion of the President, with pay of two and one-half per centum, per annum of service, of his last total pay on the active list."

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PLANNING AND ESTIMATING NAVY YARDS

BY CAPTAIN GEORGE H. ROCK (CC), U. S. NAVY

THE success of a manager in a navy yard for the cycle commencing with July 1, 1921, is likely to be measured by the Department's opinion of the results accomplished (a) in reducing costs and (b) in getting work finished on time. This order, it will be noted, would be reversed in time of emergency.

The most important section of the manager's organization, the one having the greatest influence on these results, is the Planning and Estimating Section. Properly organized and directed, the Planning and Estimating Section is necessary to efficiency. The combination, planning and estimating, is a logical one. The navy yards must submit estimates for much of the work for the necessary information of the Department before the work is ordered, and also some work which is being handled on a competitive basis just as private plants submit bids. The navy yard estimate is a statement of an amount it is decided the work should cost and the private plant bid is the amount for which the work will be undertaken and may be an estimate of the actual cost or it may include a profit, etc., depending on circumstances.

An estimate is either (1) planned or (2) approximate. For a planned estimate the job is investigated in detail and a plan of the work is prepared, this plan being made use of later by the planning section. An approximate estimate is not a planned estimate and may be based on data which has been collected covering similar work on other ships, or at previous times. Such a collection of data should include, also, standard estimates which have been made for such standard articles as have been made, these standard estimates being revised and added to from time to time.

Definite progress along the line of establishing an estimating section, or a planning and estimating section, was evident at nearly the same time, about 1909-10, in the navy yards at Mare

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Island, Puget Sound, and Boston. These steps were taken independently so far as the Boston yard was concerned and probably also as concerns the two West Coast yards. Since that time planning the work in a navy yard has been in and out of favor—mostly out—and at the present time cannot be said to be enjoying a promising look-in. There is no better example of the fact that experience must be acquired and cannot be passed along to a beginner. The complications in this particular case, however, are special. There is no continuity in the officer personnel, nor in the organization of navy yards, and the satisfactory installation of a planning section requires, above everything else, that steps be taken only after enough investigation to be certain of the principle involved and thus ensure that steady progress which cannot possibly be obtained with changes, certainly with frequent changes, in management. Changes in navy yard organization could hardly have been more frequent and more radical than since about 1909, when the introduction of modern management methods in navy yards was first seriously studied and undertaken.

Before that time, when estimates had to be prepared, the methods in use were not worth much and the estimates were of corresponding value. At the best an estimate was simply a guess and based entirely on such incomplete records as had been kept of estimates made and costs reported on more or less similar earlier jobs. There can be no better data than similar cost figures; but the way costs were kept and charges were made in the early days made the data valueless for comparisons. Even if all charges had been accurately made and recorded there were no operation costs recorded—only total job order costs. The master workmen or foremen made the estimates on short notice, that is they actually spent very little time on them, and added a percentage which they thought would make the totals large enough. The officer in charge of the preparation of the estimates would accept the figures handed in or he would add his percentages based on his experience with the individual foremen.

The estimates were not estimates but guesses at probable costs prepared by men whose primary interest was to see that the figures were made large enough. The master workmen were accustomed to doing all sorts of additional jobs for the ships

and it was easy if there were some catch-all estimates with enough margin to stand the charges. There has always been an aversion on the part of ship's officers to putting in writing requests for items of work on a ship undergoing overhaul which have been thought of after the original list was sent in. Often the head of the department on the ship who wants the item does not desire to convince his commanding officer of the necessity nor to explain why it was forgotten originally; often other generally similar reasons apply. Therefore the yard representative in charge of the work is approached. If he is hard-hearted other efforts are made until finally the necessary persuasion or pressure is brought to bear and the item is ordered. According to the way work was handled this was done by selecting the most appropriate job order number to which the charges could be made. The new item usually had no connection whatever with the item covered by the job order to which it was finally charged, and such new items undertaken without special authority during the progress of the work and which the estimates did not cover, often amounted to a large percentage of the total cost of overhaul on the vessel.

The estimates finally submitted were a joke so far as being accurate estimates was concerned. Yet there are officers today, and in positions of high responsibility, who say that is the way to prepare estimates—to abolish the planners and estimators and to return to the former methods, inaccurate and unreliable as they were.

Even if the total costs as finally reported covering the overhaul of a vessel, agreed fairly well with the estimates as submitted, that was no proof of accuracy of estimates. Unfortunately, but as was well known, it was usually a proof that the masters had been keeping cost records on the jobs. Accurate charges are most difficult to obtain at any time—the cost returns now of any job of reasonable size will be found on analysis to contain many errors, many of them large ones. Accuracy in those days meant even less. To constantly scrutinize the returns in the effort to keep the charges reliably accurate meant a great deal of arduous, tedious office work combined with a very accurate and complete knowledge of the status of each job, and the study of the detail cost returns had to be kept up-to-date

or it would not result in necessary corrections, and such returns would not be worth much. The result was that they were not studied and watched in that way—there was not time, and it was not even possible except for a very few special jobs.

The experience as to inaccuracies in charge against job orders is not confined to navy yards. The conditions and results are similar in private yards. Some contractors issue special job orders to cover changes, or jobs for which they intend to submit claims for extra compensation as changes from the contract plans and specifications. These cost returns in the past on Government vessels (in some yards) have been open to the Board on Changes and the detail charges have been furnished daily—say the second day after the work was performed—to the resident inspector (officer) who kept the data for the Board. The inaccuracies constantly present in such charges are naturally very similar to those in navy yard returns. The very nature of the thing ensures such inaccuracies. Job order numbers are complicated; supervisors or mechanics who make out the time chits have other exacting duties which demand their time, and often have dirty hands and a stubby pencil with which to make their entries; figures and letters are not made accurately and legibly; and are easily read incorrectly; often accountants know little, if anything, about the work and they add to the errors by making other errors in transcribing from the time chits; and it means nothing to many clerks in the accounting office that a boilermaker is being put down in the final charges as working on the installation of a toilet in a bathroom or a sailmaker on the job of patching a bulkhead or a boiler. Indeed many wrong charges, even, sound plausible enough as many trades can be involved in many jobs and the possibility of error lurks in every charge. Real familiarity with the job is essential before the charges against it, for labor and for materials, can be studied and errors detected. When so many jobs are involved, the time for such study is not available. The officer handling the work can only expect to strike the high spots on certain jobs. There are not enough of us to go around in these days of shortage of officers, to have officers assigned who are able by experience to handle the work. Maybe the balance sheets average up in the long run—the total charge against a ship on which \$100,000 has

been spent may not be out over one per cent due to such errors; but the individual job orders are out very much more—and formerly the total charge against a particular vessel meant at the most that the total of this amount handed in against her might be approximately correct, although the list of the items of work done probably was not very complete. When the cost returns were made up no one knew much about them. Some knew from long experience, that they probably were very inaccurate. The outstanding requirement was that if the cost exceeded the estimate by a certain percentage, an explanation was required. The returned costs of job orders after completion of work on a ship was often a remarkable paper. The very large percentage of jobs for which the final costs were within the allowed tolerance of the estimated costs was very striking. Even so there were always explanations necessary and the total cost very frequently exceeded the total estimated amounts by very large figures. This is not surprising in view of the way estimates were made and job orders handled. The wonder is not that the final costs differ so much from the estimates. The wonder is why and how the estimates are so close. Will a man who made an estimate on work he is to do ever estimate too low or miss his estimate very far? Greatly overrun estimates could usually be traced to loading up the job with unrecorded extras. The estimate has to be made for many assumed conditions; such as the kind and amount of work in the yard; the location of the ship during the time the work is done; the particular supervisor, particular men, and the particular ship superintendent whom it is possible to place on the job; the conditions of weather; the number of times when the work has to be stopped on account of more urgent work for the particular gangs employed elsewhere in the yard, or on account of lack of funds, etc.; and other generally similar conditions, all of which affect final costs.

The estimate has to provide for all of these, and is now based, as much as possible, on returns of costs of operations, which are few indeed, in regard to most jobs. The accounting offices have not been able to furnish many cost returns, and those data therefore, in the planning sections are far from complete. The yards are prohibited by law from making studies—that is, time studies and the like—of jobs in progress, and therefore are un-

able to fix on satisfactory actual costs for standard operations, many of which otherwise could be collected and used in future estimates, and which would make them just that much more accurate. Also, as the work progresses, there must be numerous places where advantageous changes in the original plan are found to be possible, and many of them are made. There is not time, and in fact, often it is considered to be too much bother to issue revised or supplemental job order specifications and to make a revised estimate to suit each such change in detail. That should be done, but practically it often will not be done. The result of all these numerous things which affect the actual cost may make it differ widely from the estimated cost, and it would be strange, indeed, if it did not. Such cost data could not be much help later in preparing estimates for a lot of generally similar jobs of projected work on the same or a different vessel. The cost in 1893 of overhauling the anchor engine and anchor gear on the *Chicago* would not necessarily bear any special relation to an exactly similar worded order in 1895 on the *Baltimore*. The actual recorded cost of each job might well have been within fifteen per cent of \$750.00; but that does not mean it was satisfactory practice to put in an estimate of \$750.00 on that item on the *Baltimore* because the records showed that cost on the similar item two years earlier on the *Chicago*. It would be a coincidence, only, if the two costs were even approximately the same. It would be a much more likely guess simply on account of the nature of the work involved, to estimate on a bottom repair job on the *Baltimore* in 1895 at say, \$300.00 for each bottom plate requiring renewal because a generally similar bottom job cost that approximate figure two years earlier on the *Chicago*, and yet comparisons of such apparently exactly similar jobs in different years but in the same yard, show the costs differ by 100 per cent. Such methods, however, are simply on the principle of accepting the estimate brought down by shooting into the flock of conditions surrounding a similar subject at some former time. Formerly some of the master workmen kept some returned cost figures of this kind; but most of them did not. They had no special place to keep such papers, and had to file and index them themselves, as no shop clerks were allowed until comparatively recently. Some

officers kept copies of cost reports and the office files usually were full of them; but as a matter of fact such cost figures actually were not used much in preparing estimates covering similar subjects. Possibly this was because it has always been recognized that the similar sounding jobs would be very different in the final analysis, and it was known also, that charges against jobs had not been scrutinized very carefully and the final cost figures therefore, probably were very inaccurate. It was much too common an experience to be exceptional for the cost figures on a particular ship on which extensive alterations were being made, to be two or even three times the estimate.

The need of some better way of preparing estimates was obvious and the recognition of the principle that estimates are not primarily a function of men whose job is to produce work cheaply, quickly, and efficiently. The establishment of estimating sections in different yards followed. This estimating section, whenever practicable, was under the control of an experienced officer and included supervisor mechanics, expert mechanics from different shops, draftsmen, and clerks. The number in the section necessarily fluctuated with the volume of work.

The mechanics were drawn into the section from the different shops on nomination of masters and when the volume of work fell off, the corresponding numbers were returned to the shops. The total number constantly fluctuated to suit the work. The section was composed largely of the men who formerly had done the same kind of work directly for the individual masters and had done that work in the masters' offices. The time-spent formerly by them on such estimating work in the shops depended on many conditions, and the planning work not done by them under those conditions was mostly turned over to the workman on the job to do in the best way he could. The only records which were available in these shop offices were such as the master workmen had managed to gather together for their own records. As a rule such records were neither very complete, nor kept in a very orderly manner, because no competent persons were allowed for that purpose, so that the real value of such records was small. A central estimating section, however, would be fitted out suitably with necessary facilities, files, etc., and with all the cost data possible to collect together. These records

would be filed so as to be immediately accessible and available for all. The officer in charge of the section would be responsible for the collection of cost figures from accounting office, and for having them analyzed and filed away for later reference. The drafting room is alongside, from which all necessary plans and calculations are obtained. The members of the section are assigned to work according to their particular experience and qualifications. These men are soon trained, their work becomes more accurate, and the lost time is very greatly reduced.

Reference was made above to the close relation existing between estimating and planning, and to the unit of the organization now existing in some yards and which has at different times existed in all yards, known as the Planning and Estimating Section. While the preceding has necessarily connected them in some of the references, it has dealt more particularly with the estimating end. The following similarly deals more specifically, although for many reasons only very generally, with the planning end.

We all certainly agree that it is most desirable to have a properly worked out plan before beginning any job. Therefore no discussion is necessary as to the general necessity and value of planning. The questions are rather who will do the planning, where will they do it, and how much will they do.

Any job is divided into two operations: (1) Planning, and (2) execution. Planning is the management's part of the job; execution is the workmen's part. Therefore the management must plan out the work or pass up to the workmen part of the management's job. The management has no right to expect a full day's work from a man if he must spend half his day planning. The planning carries the job from the time of receipt of the order to the time that the workman lifts his tool to work. It consists of:

1. An analysis of the job and a division of the job into certain "machine" or "trade" operations.
2. The working out of detailed instructions covering each of these operations.
3. The routing of the work (to the machines) in the proper sequence.

4. The providing of tools, materials, and everything to work with in advance.

In other words, planning defines the job and provides the proper conditions for its efficient accomplishment.

Planning does not mean outlining today a man's duties for tomorrow. It means rather outlining the means and methods of doing a job before starting it. The decision as to the means and methods of doing a job is perhaps the most important part of its accomplishment and for this the management relies upon the knowledge and experience of the master workmen and other supervisors, and it is necessary to inspire them to exert their best efforts. Having decided on the means and methods, the remainder of the operations of planning is largely clerical and should be handled automatically by the system.

The work in a navy yard naturally divides itself into two classes:

1. Inside work, or work done in shops.

2. Outside work, or work done outside shops, on the ship or in the yard.

For the inside work, all the planning is done in the shop and there is for each shop a central routing board in the master workman's office from which the status of any job in the shop can be seen at a glance. For the outside work of the yard—which is mostly the work on the ships—we would have the unit planning board on the ship; the central planning board, for the routing and planning of the outside work, would be in the main office. The method of handling this central planning board for outside work is somewhat as follows: The job in place of being forwarded to the master's office, is forwarded to the central planning office. From here, the master workman is called into consultation (it will be understood that this does not mean the master workman is called up to the main office building—as a general practice the planner confers on the telephone and makes an appointment as to time and place to suit the condition), and the job is gone over with him, after which the route sheet is prepared in the planning office and approved by the master workman before being issued, after which the instruction cards are made out. Thus the master workmen are given direct control over the methods and means of doing the work.

It will be noted that at any time when information is desired by the master workman or any one else as to the progress of any particular class of work in the yard, it is immediately available from the planning board by consulting it for any particular trade. If the arrangement indicated does not suit the urgency of any job the force can be immediately re-distributed to meet the demands. This system places the work intimately under the control of the master workmen. It permits them to determine before starting a job the exact method to be followed in doing it and it also lifts from their shoulders much clerical work and memory work, this burden being placed on the system, thus permitting the master workmen to devote their time to the actual supervision of the job and to the instruction of the workmen. This giving of instruction and assistance to the workmen is a very important feature of the system, certainly often much neglected, and it enables the men to do the work in the best way. This is quite different from an older system, all too common, of putting a man on the job and letting him work out his own salvation. Certainly this is an important part of a supervisor's duties and one of the principal duties for which he is appointed. He must be assumed to have better knowledge of the best ways to do a job than the workman and he is given the higher pay as a supervisor so as to secure benefit of his greater experience among the workmen assigned to him. To suppose that the ordinary workman is as capable as his supervisor in devising methods and means is an acknowledgment of the inferiority of the supervisor. We are after increased output and certainly the man working under proper instructions will do a great deal more work (usually) than the man who is allowed to follow his own methods. Is it a question of methods of work or of exact instructions as to what is to be done? A properly planned job usually does not leave alternate methods to follow. A shipfitter could get out a bulkhead by templating every plate on the ship, but proper planning would require all the templating to be done from the floor (mold loft). In either case the method of preparing for fabrication and erection would be the same. Where work is not planned by those most competent to do it, the man on the job does it himself, usually with a tremendous waste of time and energy. Proper instruction

assists men to higher ratings and improves the efficiency of the entire force. Where the work is not planned the master workman spends a very large amount of his time each day answering questions of those under him as to the job to be undertaken next; the urgency of this or that job; the distribution of this or that group of men; the extent of this or that job, etc. Most of these questions asked are questions which should be answered before any work is started on a job. Not only is time wasted in asking and answering and discussing such questions, but often the master workmen cannot reach a decision then and must consult further with the drafting room or the files.

The principal criticisms heard against the planning section in a navy yard are that the cost of doing the work is increased, and the time required is longer on account of work not being started promptly. It should not be difficult to convince anyone that these arguments are altogether wrong. Certainly any work properly planned must cost less than if it is done, without such planning and has to be sort of planned as the work progresses. Surely the planning can be done more cheaply by experts who are properly trained to do that particular work, and who are given all facilities necessary to do that work quickly and accurately, than if done by former methods where it was laid out piecemeal, if at all, and the workmen assigned to the job allowed to dally along while waiting for the next piece of information, or taking time to go to the shop to find the supervisor who could explain the next step to be taken, or sitting on the job and trying to plan it out for themselves, with the result that often happened of having to change the work later because it was not planned to suit the man higher up who ought to have planned it himself. Every job carries in its costs, the cost of planning, but while the cost for planners is definite and easily obtained, it is impossible to arrive at the cost due to haphazard instructions to the workmen, and the loss of time from the man puzzling the work out for himself.

Where the planning is properly charged with delay in starting work, it is the fault of the details of the system and not at all of the principle. There is no reason whatsoever why any job, no matter what it is, cannot be started exactly as quickly in a yard where the planning section is most highly developed as it

can in that or any other yard where the planning section has been abolished or has never existed. It is not at all necessary for the workmen to wait for written instructions in order to commence the work. That is better, and should be followed where the conditions permit it; but where they do not permit, the work can be started as soon as the vessel is tied to the wharf. Jobs like the latter are exceptional and will not be many. They will be limited to the one, or perhaps two biggest jobs on the ship, and for them the immediate planning—that for the commencement of the work—can be done in person on the ship with the men, the planner and the master workman with the officer in charge of the planning of the work going to the job with the workmen who must commence the work. The job can be laid out in a few minutes, to last the balance of the day, and before that time the regular instructions can be gotten out for the succeeding step, and then it is easy to keep ahead of the workmen while complete planning of the job is being made. Criticisms that the jobs are unnecessarily delayed and take longer to perform because the work is commenced later are frequently thoughtless, and are made without taking into consideration the fact that when the job is properly planned out, the actual working time on the job will be less, and, of course, the job can start later and yet finish earlier. The actual time a job is commenced is a very intimate part of the planning. Obviously all jobs cannot be started at once. The work must be carried on to suit the force, and jobs necessarily have to be started all along the line from arrival to departure of ship. It frequently happens that this apparent delay in starting some of the jobs is the cause of criticism of the planning system, when as a matter of fact this very delay is more often than not, the result of a careful plan for the completion of all work and not letting minor items interfere with major jobs. Also, we have gotten away from the idea that often used to prevail in many yards that the cost did not mean very much anyway, and the primary object was to get the work done. The cost does mean much and does enter into the plans, and necessarily so. And it may well be that the job does actually take longer but costs less, due to the proper planning. If that result does not interfere with the departure of the vessel, and therefore does not interfere with the necessary military

arrangements involved, then the fact that the job took longer but cost less should be the occasion for commendation and not for adverse criticism.

The subject is big, and there are many points of view. It is only necessary to thoroughly understand what the planning is accomplishing for the efficiency of the yard and for the cheapness of production in order to approve it. The worst effect on the planning is the occasional abolishment of the planning section for the announced reason of improving or increasing the efficiency of the yard. That gives such a black eye to the system that it takes a long time to recover.

All that is accomplished in the naval service commencing with the instruction of recruits and midshipmen is planned, and planned in detail by people assigned that work as a major function whether it is called by that name or not. It is highly illogical to condemn the planning section for navy yards, or to cripple it, simply because figures as to what is paid for this service are segregated and easily accessible. All practical experience shows that this is the cheapest form in which this service is obtainable, but the very fact that any job handled on the hit or miss system carries extra costs all along the line renders it impossible to ever produce exact figures to prove the case.

A NAVAL POOH-BAH

BY REAR ADMIRAL J. L. JAYNE, U. S. NAVY, RETIRED

NAVAL officers of the United States are educated to perform many kinds of duties, ranging from junior deck officer or assistant engineer to commanders of battle-ships and fleets, and may, on occasion, be required to fill civil posts in the government or our insular dependencies. But I doubt if many other officers have filled so many different offices at the same time as fell to my lot in Samoa, soon after the United States established a naval station there.

In the summer of 1901 I was a lieutenant, serving on the U. S. S. *Philadelphia*, as watch-and-division-officer. When the *Philadelphia* went to Samoa, taking a relief crew to the *Abarenda*, the station-ship there, orders came assigning me to duty as navigator of the *Abarenda*, with additional duty as engineer officer.

When we arrived in Samoa we found the executive officer of the *Abarenda* in temporary command of her, and acting commandant of the naval station, and acting Governor of American Samoa in the absence of Captain "X," on leave in the United States. The executive officer was not in good health, and his strength would not permit him to perform so many duties, the climate being enervating, so he assigned me to relieve him as executive officer; thus I became at the same time executive officer, navigator and senior engineer officer of the *Abarenda*.

As the stations of the executive officer and navigator are often on the bridge of a man-of-war when that of the chief engineer is the engine room, particularly on entering and leaving port, the reader may ask how one man could perform those various duties at the same time. Knowing that my duties would call for me to be in two places several hundred feet apart at the same time, and that I could not divide myself so as to perform this feat, I asked the commanding officer where he wished me to go. He assigned me to take station at the engine room door. From this place I could go quickly either to the bridge or the engine

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room as required, and I could speak to men in the latter place by simply putting my head inside the door. I took this station the first time that we got under way to leave port; but the commanding officer, finding that he could not at all times know the position of the ship with reference to rocks, shoals and other hazards, without the assistance of the navigator, had me with him on the bridge after that when in the vicinity of such dangers.

After I had been performing the duties of executive officer, navigator and chief engineer for several weeks, the health of the temporary commanding officer took a bad turn and he was sent to the United States on sick leave. This automatically made me commanding officer, acting commandant and acting Governor, in addition to the three offices named above, and I acquired another office, that of the president of the High Court.

Under the organization of the government in American Samoa, as it existed at that time, the commandant was *ex-officio* president of the High Court, but while I temporarily acted as commandant I did not find it necessary to exercise the judicial functions. However, after the new commandant had taken command, he assigned me to take his place on the High Court while he busied himself with the larger affairs of government. While serving on this court I had the interesting but disagreeable experience of re-trying a white man who had been convicted by the District Court on a charge of assaulting a native woman. The most unpleasant feature of this affair was the conduct of the counsel for the defendant. His behavior suggested the shyster criminal lawyer, with a jury composed of men of the type of the defendant; and as presiding officer of the court, it became my duty to call him to order very often. He knew nothing about law, but thought he knew a great deal. He was much chagrined that the result of his efforts was that the High Court confirmed the action of the Lower Court in convicting the defendant, and increased the severity of the sentence.

During the time that I was in temporary command of the *Abar-enda* and acting commandant of the naval station, a number of unusual things occurred. The first thing of note was the unexpected arrival of the commander-in-chief of the United States Pacific Station, on the Flagship *Wisconsin*. We had no idea that there was a man-of-war within two thousand miles of us, when

one morning about sunrise, the officer-of-the-deck, who was much excited, reported that an American battleship, flying the flag of a rear admiral, was entering the harbor; and in a few minutes he came back and reported that she had made a signal to prepare to go to Apia. Apia was the capital of German Samoa, and the idea immediately entered my head that we were at war with Germany, and the admiral proposed to capture Apia. This occurred about the time that President Roosevelt had the little dispute with Germany, about the Venezuelan matter, and the last papers which we had received gave the information that the President had taken a very firm stand in regard to Germany's action in Venezuela.

My surprise was quite great when I learned, on going aboard the flagship, that her errand was not of war, but to conduct a court-martial in regard to certain charges which had been preferred against Captain "X," then on leave in the United States, but due to arrive in twenty-four hours; and the admiral wished the *Abarenda* to go to Apia to get witnesses. We had no idea that a court-martial was to be held, and as the captain was a great favorite with the natives, and highly honored and respected by the officers of the *Abarenda*, who had served under him, there was great surprise.

The captain was a very able officer who had been sent out by the Navy Department to establish a naval station and Government of American Samoa. He had performed these duties to the great satisfaction of the natives, and, as far as we knew, to that of the Department, but it seemed that there was a trader in Apia who called himself an American, who was not satisfied because the Governor had not taken his advice on certain matters. His idea was not at all unselfish, and he proposed measures to the Governor which would have been very beneficial to himself, but not to the natives. The Governor was wise enough to see this, and to decline to act as advised, much to the disgust of the trader, and hence the charges.

It appears that the Governor was very popular in Apia with practically everyone but this trader and his men, so the trip of the *Abarenda* resulted in not bringing a single witness against the captain, but a letter to the admiral signed by the leading white men of Apia setting forth what a fine man he was. The admiral

had expected that the American Consul-General at Apia would be available to give evidence before the court-martial, for the prosecution, but that gentleman had died. Of course the admiral could not disband the court and call the trial off on the strength of the testimonial of the prominent citizens of Apia, as he had been sent to Samoa for the especial purpose of holding the trial and the Navy Department had gone to the expense of sending the U. S. S. *Solace* to Samoa to carry the personnel of the court, of which Rear-Admiral Robley Evans was president. Being disappointed in the result of the *Abarenda's* trip to Apia, the commander-in-chief decided to have her make a second trip and take his chief of staff to secure witnesses, and it was hoped that the son of the late Consul-General could be persuaded to appear as a witness; but this he refused to do.

Captain "X" had arrived before I left on the second trip of the *Abarenda* and he asked me to carry a letter from him to the Governor of German Samoa, asking him to appear before the court as a witness for the defense. I gladly agreed to do this, as it did not conflict with my duties, and I had a very pleasant interview with the Governor, who proved to be Dr. Solf, a man who has recently come into world prominence as German Minister of Colonies. The Governor said he had a very high regard for Captain "X," and would gladly accede to his request, but he feared his home government would not approve if he left his post to go to a foreign country on such an errand, and therefore he felt that he must decline. Consequently the trial was held without any witnesses from Apia, and resulted in an honorable acquittal for Captain "X."

The natives of Samoa like Americans, and especially American naval officers and bluejackets, and they requested permission to give a formal greeting to the commander-in-chief of the station and Admiral Evans, and the other high officers who were assembled for the court-martial. It was accordingly arranged that these officers should assemble on the porch of the little building which was used for the headquarters of the naval station and custom house of the island. The porch looked out on an open space of about two acres in area, about which the village of Pago Pago was built, with a white concrete building, the Christian Church, near by. The natives from Pago Pago and other villages

around the bay and from all parts of the island formed in a procession, led by Mauga, the native Governor of the Eastern District of Tutuila, and passed in review, with a cordial "Talofa" or other native greeting, and almost invariably deposited at the feet of these officers, some material token of pleasure at their presence, such as a fine bunch of bananas, or fresh cocoanuts, pigeons just killed in the forest, or young chickens from the small farms. The broad smiles and cordial tones in which the native words of welcome were expressed left no room for doubt as to the genuineness of the welcome, and so numerous were the gifts that the local supply of chickens, et cetera, was so nearly exhausted that it was difficult for us on the *Abarenda* to buy sufficient food for our tables for some time.

The procession was very picturesque. Every native man wore a lava lava or loin cloth of fine tapa, richly ornamented with figures, or perhaps it was a fine mat, left as an heirloom by some ancestor, or it may have been simply leaves of tropical plants or long grass strung on a cord of cocoanut fiber. The women, however, as a rule wore their best hallacous or mother-hubbard gowns; many of them, both men and women, wore wreaths of flowers on their heads or around their necks, and others had gorgeous colored hibiscus blossoms over their ears, while some had necklaces of sharks' teeth, coral or colored beans or berries, and some had perfectly white hair, that is, their very black hair was covered with a coat of whitewash made from coral. Many of the men carried spears or war clubs, but this was only in honor of the guests as the troops at military reviews in civilized countries march with arms.

Although Captain "X" was honorably acquitted of the charges preferred against him, his duties as regards the ship, naval station and governorship, remained unofficial as long as he remained in Samoa, and I continued to perform the duties in relation thereto, which had been his, until I was relieved eventually by Captain "S."

As previously stated, the natives were very much attached to Captain "X." On his last visit to the large village of Fagaitua in the Eastern District of Tutuila, before leaving for the United States on leave of absence, they informed him that they intended building a fale or native house for his sole use, so that when he



ENTRANCE OF PAGO PAGO HARBOR

next visited them he would have it for his own to do with as he pleased. Now that the court-martial proceedings were over they desired to present the fale to him, with due formality. Consequently I organized an expedition to go to Fagaitua, and as the trail from Pago Pago to that village was impassible for white people who wore shoes, we went by boat. We had to go outside the land-locked harbor and several miles at sea to a little cove where we could effect a landing through surf with the assistance of natives, who carried us on their backs from the boats to the sandy beach above the high water mark.

In the party were Captain "X," Mauga, the Native Governor of the district and myself, and our wives. The landing in the manner described was a thrilling experience, especially for the ladies in the party, but it was made without accident, and we were repaid for our trouble by a very entertaining experience. The entire village was en fête. All the natives were attired in their most picturesque costumes and arrayed in orderly fashion for passing in review before the official party, for which a place of honor had been provided where we were protected from the tropical sun but could see and hear all that went on under the shade of the beautifully shaped thatched roof of the fale, which was to be presented. There were orators for the occasion who told the captain and all of us how the people loved him, and what pleasure they had taken in constructing the fale for him, and how they hoped he would use it very often so as to be among them. And in making these speeches they did not forget to tell how pleased they were to greet the captain's wife and express the hope that she would favor them with her presence.

The fale was the most beautiful that I had ever seen, and gave evidence of very great care in construction. The curves of the roof were very graceful and as usual there were no nails and no metal in any form used in its construction, yet it was evident that it was so strongly put together that it could resist the strongest winds that it was likely to encounter, and keep out torrential rains. It was evident that much thought had been given to preparations for our entertainment. Special arrangements had been made for the comfort of the ladies, and the wives of the chiefs played the part of hostesses very prettily, and our appetites were satisfied by an elaborate banquet of native food in which fish played an important part.

Captain "X" thanked Leiato and his people very graciously for the honor they had done him, and expressed his regret that he would not have many opportunities of being with them as it was necessary for him to return to the United States in a few days, and he asked if, under the circumstances, he might turn the fale over to the acting governor and his wife to be passed on to their successors, so that the governors would always have an official residence in their village. This they willingly acquiesced in, and the fale was therefore turned over to me and my wife, to be passed along to our successors.

THE FITA FITA GUARD

The *Abarenda* carried as part of her crew thirty natives who were enlisted for special service and were used at the headquarters of the naval station at Pago Pago for police duty, and as a crew for the commandant's barge. These men were drilled as infantry, in the use of the service rifle, et cetera, and wore as uniform the regulation white undershirt, a red turban, and a blue lava lava trimmed with three red bands on the bottom. They were splendid physical specimens and never failed to impress strangers very favorably, especially when manning a barge. They were expert boatmen and could make a landing on a surf beach in the most approved fashion, jumping into the water up to their waists and gripping the gunwales, ease the boat through the breakers, and haul it up on the beach clear of them, and then take the passengers on their backs and carry them beyond the high water mark. They pulled a beautiful stroke and made a very dignified appearance in taking the commandant alongside a man-of-war, or pulling him about the harbor. Some of these men were native chiefs and all were men of good standing among their people. Leiato, the high chief of the large village of Fagaiture in the eastern district of Tutuila, was a petty-officer in the guard.

THE MCKINLEY ROAD

A few days after the arrival of the steamer from the United States, which brought us the news of the assassination of President McKinley, Leiato came to me and asked for leave to visit his village and informed me that his people desired to hold a



SAMOAN CHIEF WEARING WAR BONNET AND HOLDING WAR CLUB

lagi, or death feast, such as they would hold on the death of a native king, in honor of the dead president. Being informed by the Secretary of Native Affairs that a lagi consisted of a carousal and a period of feasting, dancing, et cetera, which might last several weeks, I told Leiato, that while his desire to honor the memory of the dead president was much appreciated, I did not think the proposed manner of doing it was desirable. I tried to explain how permanent memorials were erected in Europe and America and suggested that his people build a permanent memorial and one which would be useful to themselves instead of spending several weeks in idleness and feasting. I suggested that, as the trail from Pago Pago to Fagaitua was not fit for one to travel on, they build a good road and call it the McKinley Road. He was given his leave, and in due time returned and informed me that his people desired to please me, but that they still desired to have the lagi. I told him I was sorry they felt that way about it; that I would not dictate to them, but suggested that they reconsider their decision. I asked him to go home again and see what they would do. The result was that he came back in a few days and reported that they had decided to build the road. It was decided to have a little ceremony of turning the first sod in beginning the work. A point along the proposed route was selected for the purpose, and a party consisting of Captain and Mrs. "X," myself and wife and small son, and the Secretary of Native Affairs, and his wife, proceeded to the nearest point inside the harbor where a landing could be effected, and then with the assistance of the natives made our way with great difficulty along the old trail to the point where we met the native chiefs and others who had assembled for the ceremony.

When all was ready Mrs. "X" and my wife turned over several shovelfuls of earth while appropriate speeches were made by Captain "X" and two native missionaries, one representing the French Catholic Mission, and one the London Mission Society. In order to show the native point of view a translation of the address by one of these is given herewith. After the addresses one of the missionaries offered prayers and the other held a short devotional service in the Samoan language. The whole party then adjourned to the nearby village of Lauili where Leiato had prepared a feast in Samoan style, and where kava was served.

The building of this road was undertaken by the natives with considerable show of zeal as well as sorrow and respect for the martyred president.

TRANSLATION OF NATIVE ADDRESS

"For the exhortation and prayer concerning the building of this road in memory of the death of the President, William McKinley, read *Genesis* 35, ninth to twentieth verses; *Nehemiah* 2, eleventh to twentieth verses, the story of the monument erected by Jacob to commemorate the death of his beloved wife. The monument was built by Jacob as a sign of her grave. The mound on which it was built was like the 'fatutai' (a heap of stones built in a lagoon to attract fish) and placed inland, that it may remain always; that he and his wife's children and family might look upon it, and that it might be known by all people traveling to and fro on the great road to Israel, as well as the generations to come after that they might see all that had been done in the past years, and that it might extend into future generations.

"It was considered that this story would be appropriate for this occasion; that it would be useful and proper. Leiato and this district agreed to do something to commemorate the death of the President, and this was their resolution: To have a death feast and go through the customs observed on the death of honored kings and great chiefs in these islands; but this district and Leiato obeyed the desires of the commandant and the officers of the government, that they should build something substantial that would last forever, like was done by Jacob. Nehemiah was in Babylon, and serving upon the King Artaxerxes, when he heard the report about the destruction of the wall of Jerusalem. Then he begged the permission of the king to go to Jerusalem and again build up the wall which was broken down. Nehemiah reached Jerusalem. The first thing he did was to go from place to place and see the condition of the wall and to observe what work was necessary. Then a second thing was done by Nehemiah. He brought together all of the high chiefs of Israel and old people, that they should deliberate about the work to be done. When that deliberation was over there was great rejoicing and much satisfaction among the people, and they began their work with pleasure.

"The weak governments of the past are like the wall broken down; but now has come the great government of the United States of America, and Your Excellency, the Governor, came, and you saw the wrong things that existed in this country, and you made exhortations like those made by Nehemiah; and then Sua and Jaifanus and His Excellency, Leiato, responded with great pleasure—such was the pleasure of the old men of Israel."

TUTUILA'S LEGISLATIVE ASSEMBLY

While the commander-in-chief was at Pago Pago on the *Wisconsin*, the time for the annual "fono" or assembly of representatives of the natives of Tutuila to decide on the tax rate drew near, and thinking that the Assembly might interest him, and that his presence thereat would lend dignity to the occasion, I asked him to remain for it. He found that he could not remain, however. While regretting the loss of prestige which I felt his presence would lend to a proposal which I intended making to the representatives, I decided to hold the Assembly at the appointed time and place in accordance with the Proclamation which I had issued, and accordingly I proceeded to the meeting accompanied only by the Secretary of Native Affairs, who was also my interpreter.

The place of meeting was a large village near the boundary between the two districts of Tutuila, several miles from Pago Pago. The trip had to be made by boat and by native carriers where the trail was impassable to men who wore shoes. The natives' feet were as tough as sole leather and their toes were developed so that they could cling to surfaces on which shoes would slip.

The assembly was held in the central square of the village. The delegates from the eastern end of the island were drawn up in line on one side of the square, and those from the western district on the opposite side. The Secretary of Native Affairs and I were located under the roof of a native fale which was about midway between the two lines. From this place I addressed the Assembly, the Secretary of Native Affairs interpreting, as I proceeded. I informed them of the need of determining the rate of taxation for the next year, and also pointed out the great need for good roads. There had been much talk of a road from Pago

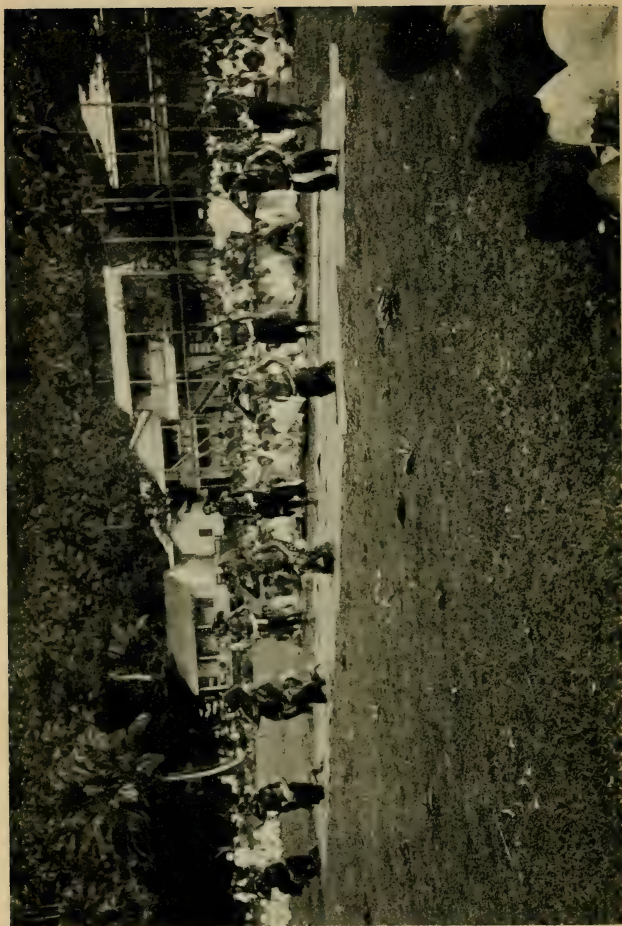
Pago to this village, the idea being that the United States would pay for its building. I informed them that there was no money available for that purpose, but proposed that they should build the road at their own expense. I described briefly how roads are built in civilized countries at the expense of the people who derive the benefits from them. I pointed out what a blessing it would be for them to have a good road all around the island.

When I had finished the delegates took up the discussion of my proposal. First a delegate from one side would speak and then one from the other side. The speakers always carried "talking-sticks" which were sticks about eighteen inches long and a half inch in diameter, with some fiber shreds fastened to one end, resembling fly swatters. The speakers were good talkers, and some of them had real oratorical talents. It soon became evident that the delegates from the western district, while favoring the road, objected to the natives bearing the expense of it, while those from the eastern district supported my proposal. My friend, Chief Leiato and the other delegates from the district which had agreed to build the McKinley Road, were warm advocates of my proposal. They told how they had volunteered to build their road and spoke with scorn of men who would insist on the United States paying for an improvement so greatly to the benefit of the natives.

The discussion grew so long and warm that I found that I must leave before a decision was arrived at, but the next day a runner came to Pago Pago to inform me that the Assembly adopted my proposal.

KAVA

Kava is a drink which is as important in Samoan life as tea is in that of the Japanese. It is made by mixing the finely divided root of the kava plant in water. If you are making a friendly call in a Samoan fale in the afternoon, you are sure to be invited to join in drinking the health of the assembled company in kava. The drink is prepared in the presence of the guests by the hostess or perhaps an attractive young girl of the family, or of the assembled company. It is a post of honor to be the kava mixer. A large wooden bowl is used for that purpose. It is placed on the floor near the middle of the room and the mixer squats by it with the rest of the company forming a circle around her. She

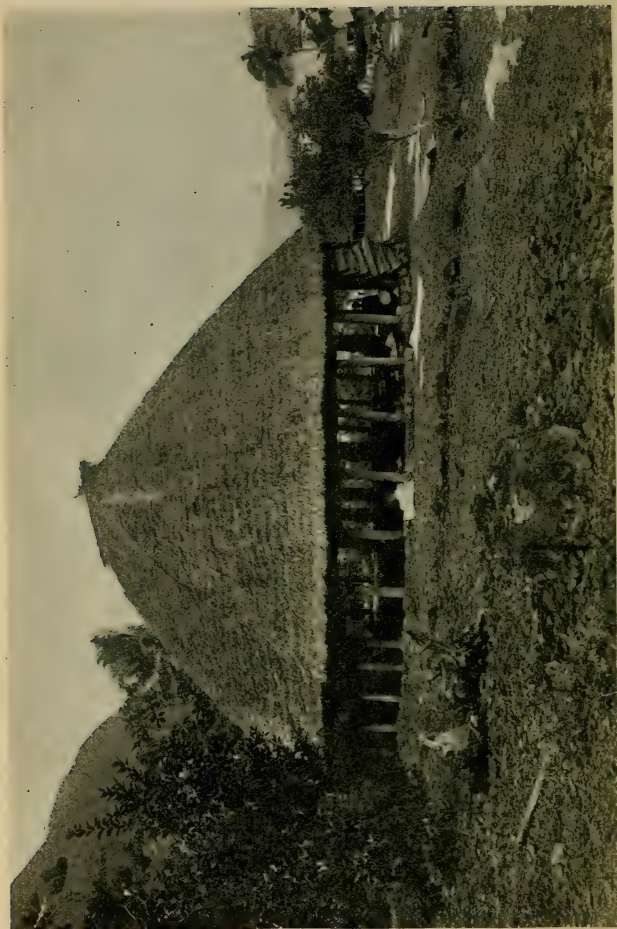


SAMOAN SIVA (NATIVE DANCE)

bites off a piece of kava root and chews it until it is sufficiently ground up by her teeth to be ready for the mixing when she puts it in the bowl of water, and proceeds. The mixing is done with both hands which are placed in the bowl of water and which push back and forth through the liquid a bunch of vegetable fiber acting as a sort of strainer. The mixer occasionally removes this fiber from the bowl, squeezing it, and then passing it to and fro in the air, keeping time to the music of a song which is sung by all the natives present. In doing this her arms and upper part of her body are moved with much grace. The song is usually led by one of the older natives and relates to some events in the history of the family or tribe. In this way their history is passed down from generation to generation. After passing the mass of fiber through the air for some time the mixer replaces it in the liquid and again proceeds with the mixing. In this way particles of air become enmeshed in the fiber, and then mixed with the liquid. In this manner the kava becomes vitalized with particles of air, although the native does not realize it.

The mixing proceeds until the liquid acquires the proper milky color, when it is served to those present, in cups made of cocoanut shells which are highly polished. On certain occasions the kava is served with much ceremony. In the Manua group the king is served by the maid of the village as a part of an elaborate ceremony, using the word "ipu" in handing the cup to him, and this word is not allowed to be used except in connection with the king's kava. The penalty for violating this ancient custom is to be driven out into the sea and never to be allowed to return. In other words, death by drowning, or hunger and thirst. The kava bowls are sometimes very handsome. They are carved from the trunks of hardwood trees and many have from three to twelve legs. They are valued according to the number of legs and degree of polish on the concave side.

After mixing and serving kava, a sediment settles on the bottom of the bowl, and this is rubbed into the grain of the wood until a high polish results, increasing with the age of the bowl, which means increasing rubbing. The taste of kava is not at first agreeable to Americans or Europeans, but it may be acquired. The drink is invigorating and very restful to one who has undergone great physical effort. It is said to be stupefying at times if



SAMOAN FALE (NATIVE HOUSE) OF MAUGA

drunk to excess, but it is not intoxicating as alcoholic liquors are.

It was the custom for the station ship to make monthly trips to all the districts of American Samoa to hold court and to attend to matters requiring the commandant's attention. On one of the trips of the *Abarenda* to the Manua group, she carried Mauga, the native governor of one of the districts of Tutuila as a passenger, as he desired to make some visits among these distant islands. We left him several hours on one of the small islands, and then got him aboard again and sailed away for Pago Pago, not realizing that anything unusual had happened. It later developed that in one of the villages kava had been served to Mauga, and when the cup was handed to him the ordinary Samoan word was used. But Mauga, not over bashful, stood on his dignity and suggested that the proscribed word "ipu" be used. The hosts said that was not allowed except to Tui Manua, the former king. Mauga, however, insisted that he was of equal rank with Tui Manua, who under the American Government was Governor of the Manuan District, while he was Governor of the Eastern District of Tutuila. This logic was enough and his hosts with great hospitality honored their guest with the "ipu." We knew nothing of this until our next visit to Manua, a month later, when we found that there had been great excitement over the violation of the ancient traditional law, and there were three men in jail charged with the crime of using the word "ipu" in entertaining Mauga with kava.

Their cases were tried by a court composed of the Secretary of Native Affairs, sitting with two district (native) judges. The court acquitted two of the men but the third having pleaded guilty, was sentenced to a mild penalty of imprisonment. We left Manua feeling that the matter was settled, but not so, for on a subsequent visit after Captain "S" became commandant, we found that there was still much feeling existing over the incident, and the natives requested Captain "S" to convene the High Court to reconsider the case. He accordingly organized a special High Court composed of himself, Commander "K," then in command of the *Abarenda*, and myself for the purpose. Of course we did not want to have the death penalty given these men, but at the same

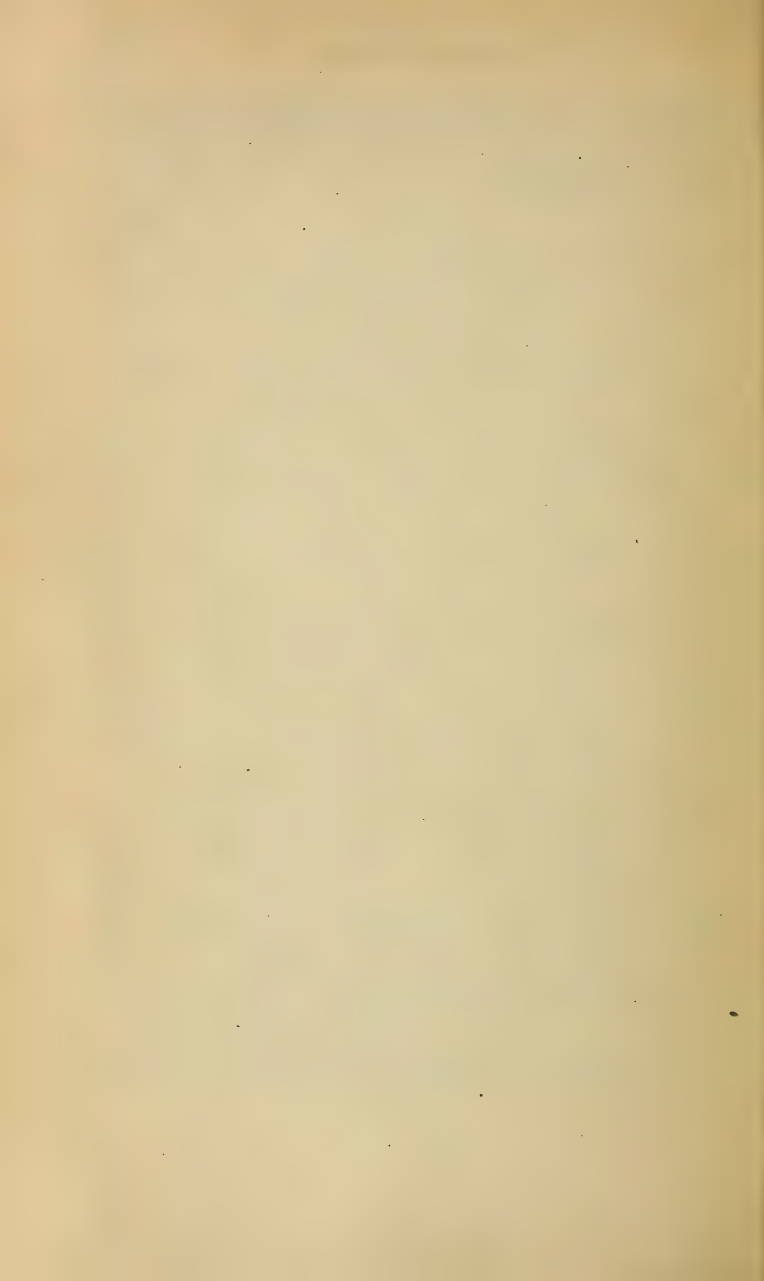
time we wanted to show proper respect for the ancient traditions which were held in such veneration by the people. For a while we were in quite a dilemma as to how to act. Finally, however, we learned of a compilation of traditional laws of Manua, which had been made by a missionary. Among these was one which required that visitors should be treated with hospitality. We argued that the men under charges had been acting in obedience to this law in entertaining a visiting governor, with the "ipu," and that as this law was a matter of record while the other was not, it should be given preference, and therefore the action of the Lower Court was sustained. This seems to have settled the matter satisfactorily.

One of the main objects in view in the government of American Samoa as organized by Captain "X," was to maintain the rights of the natives, and to prevent unscrupulous adventurers from taking undue advantage of their ignorance. As an example, the natives were not allowed to alienate their land to foreigners, and alcoholic liquor was not allowed to be sold to them. The medical officers of the station ships were encouraged to give medical attention to the sick, and naval officers universally endeavored to promote friendly relations. As an evidence of the friendly feeling of the natives, toward officers and men, on the arrival of an American man-of-war, they would flock around her calling to officers through their stateroom ports, "You my felini," meaning, will you be my friend? If he said yes, they would begin an exchange of presents only to end when the ship left.

At each meal hour the natives were allowed to flock on board and were given large quantities of food. Mr. Frederick O'Brien in his *White Shadows of the South Seas*, paints a very dark picture of the harmful results of the contact between the white race and the South Sea Islanders. But certainly the American Navy's contact with Samoans has not been such as to deserve severe criticism. It is understood that Mr. O'Brien has spent some time in Samoa since he published the very interesting book named above, and I have heard that he intends writing another one regarding Samoa. It is hoped that he will show another side to his picture in the new book.

In the twenty years which have elapsed since the incidents here related took place, I have had duties which in variety cover a wide

range, but not wider than was covered by my duties as described, and never have I had to fill more different offices at the same time than while playing the rôle of "PooH-Bah" in those distant "Mystic Isles of the South Seas."



DISCUSSION

The Practical Application of The Principles of High Command

(See Page 2041, December, 1922, PROCEEDINGS)

REAR ADMIRAL N. C. TWINING, U. S. NAVY.—In this thoughtful and logically developed paper by Captain Laning there is so much that is of value to the naval student of the subject that one hesitates to criticize or to disagree with any part of it. In its treatment of the problem of organization, however, certain statements are made which do not seem to be entirely justified by facts and which, if accepted as correct, lead to unsound conclusions.

The following extracts from the paper are quoted as embodying the burden of the author's argument for the organization of a fleet on the task-group principle:

(1) The first step in developing a war machine is to organize it properly to do the work it will be expected to do in war.

(2) . . . on coming to a position of high command, the first thing an officer has to do is to make estimates of the situation, ascertain who the probable enemy or enemies are, determine the fighting his command may be called on to do in case of war with them, and then decide on how he will carry on the fight and on his *task organization* to fight that way.

(3) This *task organization* for war, derived from those estimates, is the organization a commander should use for his forces, not just during war but during peace as well.

These statements, broadly considered, seem to constitute an entirely logical argument for a permanent task-group organization of the fleet but when one looks more closely into the facts and conditions some doubt arises as to the correctness of the conclusions expressed in the second and third statements.

One may concede the possibility of estimating at any given time who "the probable enemy or enemies are" and, on the basis of such estimate, of making strategic plans for a war against such adversaries; but one may question whether the fundamental and permanent organization of the fleet should be planned on that basis. The doubt that arises on this point is due to consideration of a number of facts the principal of which are:

(a) The same task organization may not serve for a war against each of the probable enemies.

(b) The task organization that seems best today may be entirely unsuitable tomorrow and frequent changes in basic organization are undesirable.

(c) Even after the best possible estimate as to probable enemies has been made the actual fighting may take on a character entirely different from that forecast and the task organization may have to be entirely changed.

(d) Peace training must prepare individual units, groups, and the whole fleet for all their probable war activities but with the most emphasis laid on those that are most probable.

A war, regarded as a whole, may be considered as a task calling for a task-group organization of the fleet; looked at more closely it is seen to comprise a large number of less comprehensive tasks for each of which a different task-group organization may be required and for which several such organizations will certainly be found necessary. While the assignment of vessels to these task groups will be determined by the requirements of each particular case the normal employment of the elements of a navy must be determined by their types each of which has a principal function in the exercise of which it must be highly trained before teamwork in any combination of types can be effective. In the choir the fundamental requirement is that each member be able to sing his part.

The fighting vessels of a fleet comprise a few distinct types to each of which a primary mission in war belongs by reason of its characteristics. For battleships the principal mission must be combat with enemy vessels of the same type; they may, due to the exigencies of a campaign, necessarily be used for other purposes such as scouting, defense of bases, or other secondary service, but the fact of their principal or primary mission remains and it is to the perfection of their ability to carry out this mission that their major training must be directed. It is true that, during the whole course of a war, they may never be employed in this particular service (as was so nearly the case in the late war) but is it any the less obvious that they should be trained principally for that work and that the fleet organization should be such as will most effectively further such training?

To cite only one other example, destroyers have as their primary mission torpedo attack on capital ships; their employment on other service has, in the past, been due largely to a lack of vessels of the precise type required, a lack which will doubtless be experienced in future wars as well. In the late war destroyers were employed less in their primary field than in other kinds of work the necessity for which was not foreseen. We all know from War College games as well as from actual maneuvers, that destroyers are often used for scouting for lack of other, and probably more suitable, vessels; we are also familiar with the solicitude of the commander-in-chief lest their employment on this duty interfere with their availability for what he felt to be their main task, torpedo attack on the principal enemy force.

Perhaps enough has been said to illustrate the point that the principal training of vessels in time of peace should be directed to developing their ability to carry out, in war, their primary mission as determined by type; training in the execution of probable secondary missions is only less necessary and, bearing in mind that we train, not vessels, but personnel—and a constantly changing personnel—training must be continuously carried on and its features continually repeated; the organization must be such as to facilitate such training.

Both chart maneuvers and fleet exercises—and war experience as well—impress the fact upon us that task groups are of an essentially temporary nature; that their constitution and composition are subject to frequent change as the needs of the situation change. Can anything so temporary in nature be made the basis of a *permanent* fleet organization?

As bearing on the question of changes in organization it seems pertinent to quote two further extracts from Captain Laning's paper:

(1) Even in a most highly developed navy an officer coming into a position of high command would be unlikely to find his command already organized as it must if it is to carry on in *his* way, and so he must always reorganize it sufficiently to fit his way. . . . If properly prepared for high command, an officer can quickly organize or reorganize his forces to meet his plans for carrying out his mission by simply dividing them into the task groups he knows he will use in war.

(2) As things are in modern navies, it often happens that neither the high commander nor his subordinates are familiar with all the uses or are well versed in the capabilities and limitations of the various forces and the new types with which they are working. . . . Even after all his preparation and training he must to a very large extent develop his plans and ideas after working with his forces to learn what they can do.

No argument further than that suggested by these two quotations appears to be necessary to indicate the unwisdom of a new high commander's immediately altering the *permanent* organization of his command: do they not, in fact, indicate, for a fundamentally sound permanent organization, an organization by types with all possible latitude granted to the high commander for forming temporary task groups "to meet his plans for carrying out his mission"? The initiative of a commander-in-chief will find ample scope in planning his fleet exercises in such a way as to:

- (a) Train his type groups in the exercise of their principal functions;
- (b) Train units in their auxiliary, temporary, or *accidental* functions by the constitution, from time to time, of temporary task groups.

May we not believe that:

(1) Permanent organization by types for training,

(2) Formation of temporary task groups for fleet exercises and for war, will best meet the difficult conditions imposed by the ever-changing and unpredictable character of naval war and that they do not represent the indefensible "difference between . . . peace organization and . . . war organization"?

The Spirit of the Offensive

(SEE PAGE 2087, DECEMBER, 1922, PROCEEDINGS)

REAR ADMIRAL W. W. PHELPS, U. S. NAVY.—I do not agree with Lieutenant Commander H. H. Frost that (page 2092) "We have now to go back sixty years to the time of Farragut to find an example of such an operation" (the spirit of the offensive) (offensive operation). I think that Dewey's Battle of Manila Bay was just as fine an exhibition of the spirit of the offensive as any operation of his great teacher Farragut. Finer, Dewey had no reserves. Farragut had. Dewey had no base to fall back upon. Farragut had. Dewey could not have suffered a repulse. He *had* to succeed. Farragut could have stood a repulse and could have attacked and succeeded subsequently. The political conditions were such that a failure by Dewey would have had serious consequences for the United States in its world position. A failure by Farragut would have had no such serious consequences. So it was more important for Dewey to make a clean job of his operation, than was necessary in any one of Farragut's operations.

Sampson's Santiago operation must be mentioned. It also is a fine example of the spirit of the offensive. I do not mean to want to detract from the greatness of Farragut. I mean to point out that the naval officer who writes of the spirit of the offensive as found in U. S. Naval History, who entirely ignores the Spanish War and makes no mention of the thoroughly offensive spirit of Dewey's and Sampson's operations misleads that great body of naval officers who have entered the Navy since the Spanish War.

The Naval Policy of the United States in the Pacific Area

(SEE PAGE 409, MARCH, 1923, PROCEEDINGS)

LIEUT. COMDR. J. W. REEVES, JR., U. S. NAVY.—The article in the March Institute on "Naval Policy of the United States in the Pacific Area" cannot be passed by without comment. With the first eight parts or chapters of the article, I have no serious disagreement and no comment to make. It might be noted that they deal with matters which are supposed to require the most highly specialized knowledge, training and experience: namely, determination of policies and formation of plans. I do not claim that those of us who are younger in years and experience cannot, on account of this fact, have any worthwhile ideas on the subject. I do claim that our ideas are of necessity the result of short experience or possibly of theory alone. This can always be profitably kept in mind. Part IX states the conclusion of the article, which appears to be that the Navy's capacity for effective industrial action should be increased. The remedy to be applied appears to be to induce a realization on the part of all officers of the importance of industrial work and of their personal responsibility in connection with it. These are general statements with which

most people are bound to agree. However, I, for one, decidedly disagree with many of the minor and incidental statements in Part IX.

Most navy yards are similar in general but different in detail. Most of them are divided into two main departments, the industrial department and military department. Officers in the military department do not perform strictly line duties and nothing else, any more than officers in the industrial department perform strictly staff duties and nothing else. Every activity that is strictly a part of the industrial output of the yard is classed as industrial. All other activities are classed as military. In one large yard, the number of officers on duty in the military department is about half the number on duty in the industrial department. The numbers of staff and line officers in the military department are about equal. The largest subdivisions in this department are the medical division, the general court martial, and the marine detail. It is doubtful if any of these duties are of paramount importance. They are naturally of some importance; otherwise, they would not exist. The most important and essential duties in the navy yard are the industrial duties, for the yard's mission is an industrial one and its success or failure is judged from this standpoint. The article in question gives the impression that at navy yards military duties correspond to staff duties and only staff officers perform them. This is quite incorrect.

The industrial department at most yards consists of the machinery division, hull division, supply division, public works division, and a few smaller offices. At one large yard there is about an equal number of line officers and staff officers in this department. Naturally, the duties in the hull division, supply division and public works division are done by staff officers. If there were any reasons for doing so, a number of the positions in these divisions could be satisfactorily filled by line officers. This is because a great deal of the work is routine, executive work, requiring little special knowledge or training beyond what the average, all-round officer has. Special knowledge and training is always desirable. However, it is required so infrequently in many billets that a much more important consideration is good judgment, energy, initiative and executive ability. These are personal characteristics, quite independent of the branch to which the officer may belong. Duties in the machinery division are usually performed by line officers. In a similar manner, some of these positions could, if it were desirable to do so, be filled by staff officers. The point is that the vital thing in many of these positions is the possession of the personal qualities mentioned above, while special knowledge and training is secondary. It is not claimed that line officers could fill all staff positions. If this were so, there would be no room for argument as regards amalgamation. But, the idea that every billet in a staff division—hull division, for example—can be filled only by a staff officer of that corps is absurd.

This brings up what is, to my mind, one of the most objectionable features of the corps system. I do not say that the corps system is necessarily all wrong or should be done away with. But it will doubtless

be admitted that there are objectionable features. One of these is the idea that an officer is competent to perform all the duties of his billet simply because he is a member of the corps under which that billet comes. It is assumed that he is better qualified than anyone not in that particular corps. And, this is quite independent of such personal qualities as good judgment, energy, initiative, and executive ability—which he may or may not possess.

It seems to me that the Navy would be better off if all hands, line and staff, realized that, aside from a comparatively few designing specialists, most billets, no matter in what branch, can be efficiently filled by any officer who has a reasonable amount of general experience, coupled with good judgment, energy, initiative, and executive ability. We need a certain number of specialists, and cannot get along without them. But, in my opinion, a lot of so-called specialists, both in the line and out, are being carried along as extra cargo on account of the mistaken idea that they and no one else can carry on the jobs that they fill, and that the fact that they are specialists is enough, regardless of whether they possess or show any other qualities. So far as navy yard work is concerned, this is not mere theory. To anyone who doubts it, I can show a considerable number of so-called specialist billets which I could fill properly. And, so can any other officer of average ability. If not, he should be ashamed to draw his pay.



Official Photograph, U. S. Navy

A MODERN U. S. NAVY TORPEDO PLANE

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER F. W. ROCKWELL, U. S. NAVY

AND

LIEUTENANT J. B. HEFFERNAN, U. S. NAVY

GENERAL ARRANGEMENT

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GREAT BRITAIN

NAVAL POLICY.—The reception accorded the Navy Estimates by the House of Commons has on the whole been good; much better than on most other occasions of the kind in recent years. It is probably right to attribute this to a general feeling of confidence in the policy so ably outlined by Mr. Amery. With the majority of members so keen on economy in national expenditure, less attention than might have been expected was aroused by the facts given by the First Lord showing how we have not only gone far beyond the strict terms of the Washington Treaty, but that our action has been taken in advance of that of any of the co-signatory Powers. No other nation has, like ourselves, broken up seventeen splendid and comparatively modern capital ships and numerous other craft, cut down reserves of ammunition, fuel and stores, and postponed necessary expenditure which ought to be incurred now. As Commander Bellairs put it, our motto has been "Trust and Scrap," that of the other Powers "Wait and See." Many people, who, like Mr. Lambert, are concerned at the taxation of this country being £16 13s. per head, as compared with £6 in America, would counsel us to trust still more. The German Fleet, we are told unceasingly, is at the bottom of Scapa Flow; we have no other immediate menace, why should we not drop quietly into a third-rate position? It is well that Mr. Amery reminds these pessimists that we have everything at stake on the sea, even in times of profoundest peace. A great Navy, once let down, cannot be improvised in an emergency.

In itself, it may be costly, but it is a form of insurance which is indispensable to security.

The House of Commons is evidently satisfied that the country gets full value for the money spent on the Navy. Even Mr. Newbold, the future Admiral of the Red Fleet, felt bound to admit that: "I do not think that the Americans, although they can spend very much more money on naval armaments than this country can at the present time, can thereby necessarily get a Navy anything like the equivalent of ours." This is a tribute to those personal factors without which the finest material is useless. As Mr. Amery showed, the process of cutting down by 20,000 the officers and men was both difficult and painful, because the lists had already been weeded out by previous reductions. The Board had to scrutinize all records in order to find some way of deciding who among officers of high ability and distinguished service could be said to have even a shade behind their fellows. He paid a tribute to the patient care and fairness of the Sea Lords in this respect. The result of their work is that the present officer *personnel* may be said to be incomparable. It is to be hoped that future entries will keep it at the same high standard, and that parents will not be discouraged from putting their boys into the Service through mistaken ideas as to the future.

Turning to the material of the Navy, the greatest interest naturally centered in the provision which is being made for developments at Singapore and for oil storage. Among the critics of the former was Sir Godfrey Collins, who spoke as a layman, but who was once a midshipman in the Navy, and who ought, therefore, to appreciate Mr. Amery's point that at present there is no dock in British territory in the East capable of taking a capital ship. It would be interesting to know on what grounds Sir Godfrey asserts that it is opposed to the naval policy of the past fifty years to construct dockyards far from the center of the Empire. Surely it has always been the policy that the distribution of the fleet must depend on the strategic circumstances of any given time, but that the Navy must be free to go anywhere. It is not free, as the First Lord has shown, to go anywhere today owing to the fact that we have neither supplies of oil nor the docking and repairing facilities required to give it the necessary mobility. We can at present neither send our battle fleet to the Far East nor maintain it there. This is the situation which calls for remedy, but it will be several years before the remedy is effective owing to the leisurely fashion in which, for reasons of economy, the work will be done. In a scheme of £11,000,000 for docks, workshops and stores, £200,000 does not go far. It will be interesting to see what attitude the Dominions take toward the cost of the project when the Imperial Conference, which it is expected to hold this year, comes to consider the matter.—*Army, Navy, and Air Force Gazette*, 31 March, 1923.

AUSTRALIA SELLS HER NAVY.—The decision of the Australian Government to sell twenty-four units of the Dominion Navy, as set forth in a recent Melbourne despatch, virtually means the end of Australia's present naval establishment.

Thus abruptly and emphatically Australia has cast to the winds the recommendations made by Lord Jellicoe following his world-wide tour of the Dominions soon after the close of the World War. One of the strongest of his recommendations was that in which he urged the organization of a powerful fleet permanently based in Far Eastern waters. Based on the value of oversea trade, he suggested that Great Britain, Australia and New Zealand divide the burden of its estimated annual cost of £19,700,000 in the ratio of 75-20-5. The composition of the projected Far Eastern fleet was tentatively set at eight super-dreadnaughts, eight

modern battle cruisers, ten light cruisers, forty modern destroyers, thirty-six submarines, excluding those in Indian waters, besides the auxiliary vessels necessary to make a well-founded fleet. Under Lord Jellicoe's plan Australia's contribution to this fleet would be a material one, and the annual cost to her exchequer would be between four and six million pounds a year.

There is no warrant for assuming that the Australians will never replace the ships to be sold with other and more powerful units. Yet there can be no doubt of the significance of the Dominion Government's decision. Its purport is plain. With her sister dominion Canada, Australia prefers to turn over to the Imperial Navy the main burden of the naval defense of the Dominions, should the danger of such an attack ever arise. The projected Singapore naval base, one of the largest in the world, must be maintained by Great Britain alone. In fulfilment of the policy of a "White Australia," it may also come about that Australia will grow more and more thankful that the Stars and Stripes still flies in Pacific waters.—*Boston Evening Transcript*, 2 April, 1923.

FRENCH AIR STRENGTH DISTURBING TO BRITISH.—Former Lord Chancellor Birkenhead in the House of Lords this evening forced the Government to admit it is seriously considering the possible necessity of increasing the air force, in view of the superiority of the French in this branch.

After quoting figures relative to the size of the two air forces, Lord Birkenhead declared:

"This is a most alarming state of affairs. The Government will be lacking in its duty to the country unless it affords an adequate air force."

He pointed out France built up a great air force while not paying her debt to Britain. He added that there is no truth in stories of great German air preparations and continued emphatically:

"That makes the situation more alarming. I do not remember a time when the tone of the French press has been less friendly to this country. This country cannot content itself in the next four or five years with an inferiority in its air force which it would not content itself with in the navy."

The Duke of Sutherland, Under Secretary in the Air Ministry, replied for the Government. He explained that after the armistice the British Government decided there could be no great war for ten years.

"But the Committee for Imperial Defense is considering the position," he added, "and if it decides that this formula no longer holds good and that the circumstances warrant a larger air force, it is quite possible it will be increased."

Finally Lord Salisbury, Lord President of the Council and deputy Government leader in the House of Lords, announced Lord Balfour, who has long been connected with questions of imperial defense, and Lord Weir, who was director of aircraft production during the war, had been added to the Committee for Imperial Defense to aid in the consideration of this matter.—*Baltimore Sun*, 22 March, 1923.

FRANCE

FRENCH NAVAL STATUTE.—The "naval statute" in France is a scheme embracing a wide policy of organization and construction, of which the result is to provide a homogeneous fleet capable of carrying out certain well-defined objects. The previous "statute" was prepared by the late M. Delcassé and was interrupted by the mobilization of 1914, which put the navy entirely in the background, and as the termination of the war left France with a sadly diminished fleet of little value, the question arose of creating an entirely new navy in accordance with the changed conditions

of naval defense. In the years immediately following the Armistice the international situation lacked elements upon which to establish the basis of a future policy. The destruction of the only naval power which threatened the security of France removed the necessity of organizing a coast defense, especially in view of the proposals then put forward for a "pact of guarantee." Nevertheless, opinion in France has never been in favor of relying upon others for protection, and the construction of a sufficiently powerful navy continued to be the background of national politics, as was shown by the claims put forward by the French delegates at the Washington Conference. It must be admitted that the signing of the Treaty did not meet with unmixed approval in France, where its presentation to Parliament was delayed until the Conseil Supérieur de la Marine had settled upon the main lines of the "naval statute." There seems to be little doubt that the Washington Treaty will be ratified with certain reservations, notably in providing greater latitude for the withdrawal of France in case of emergency. It is argued that the country cannot allow itself to be bound down by limitations which may affect the national security. The whole question has, therefore, developed much larger issues than were presented at the time of the Washington Conference, when it was urged that the French naval policy aimed merely at an efficient coast defense and the guarding of a seaway between France and North Africa with the aid of submarines and fast cruisers.

That policy certainly underlies the first part of the program of naval construction which was begun recently. A beginning had to be made with the most necessary and least costly types of craft, consisting of three fast unprotected cruisers, six destroyers, twelve torpedo boats and six sea-going submarines. This short program is to be extended by a second installment of constructions from 1925-30, and the list of vessels in the proposal which has just been submitted to the Chamber of Deputies comprises six light cruisers, fifteen destroyers, twenty-four torpedo boats, four "cruiser submarines," thirty first-class submarines, two mine-layers and four oil transports. For the moment the French are concentrating upon the submarines and light surface craft authorized by the Treaty and forming part of the defensive organization which will be completed by an air service in conjunction with seaplane carriers and an unrestricted number of small submarines for coast protection. The submarine has always cast a spell over French public opinion, which exerts a powerful influence upon the decisions of the Government departments. Public opinion is by no means satisfied with the limited character of the submarine program, and there will certainly be a lengthy debate on the restrictions imposed by the Treaty on sea-going submarines when the "naval statute" comes up for discussion. Consequently, the purely defensive policy is already assuming the offensive, and while having the right to build as many light underwater crafts as they please for coastal operations, our French friends will not submit without protest to any considerable limitation of sea-going submarines. On the other hand, the Conseil Supérieur de la Marine has never been willing to sacrifice capital ships to under-water vessels, and the arguments against a complete dependence on submarines have only been partially modified by the association of submarines with seaplane carriers, whereby the submarine will be given a wide range of vision. Still, submarines are neither able to navigate at the speed of surface ships, nor to attack in formation under water. Consequently, they suffer from limitations which render it undesirable to sacrifice large surface vessels.

In the first two installments of the naval program no provision is made for the construction of capital ships. That omission is partly due to the limited financial resources and, more especially, to the belief that it is wise to wait for further battleship developments before deciding upon a definite type. In any case, it is not likely that new capital ships will be constructed

before 1930, by which time some of the existing ships will be dismantled and full advantage will be taken of the 177,800 tons allotted by the Washington Treaty to create a homogeneous and entirely up-to-date fleet. The situation, therefore, is fairly clear, and will not be considerably modified by the forthcoming debate in the Chamber of Deputies. In the present state of finances the country must do the best with its expenditure, and it considers the only possible plan to be to build submarines, light surface ships and aircraft, but the program now comprising "cruiser submarines accompanied by seaplane carriers will be compelled eventually by a number of new capital ships. The program itself is not dependent upon the ratification of the Washington Treaty, for in the improbable event of Parliament insisting upon reservations which the other signatory Powers could not accept, the program would be extended as circumstances required. It is affirmed that efforts will be made to make a ratification of the Washington Treaty conditional on the Versailles Treaty being carried out in its entirety. If this be, indeed, the case, complications may arise that will endanger the agreement which has been come to amongst the leading Powers for a limitation of naval armaments.—*The Engineer*, 6 April, 1923.

FRENCH NAVAL STRENGTH.—The following statement, which includes all battleships, cruisers, light cruisers launched since 1902, and flotilla leaders, destroyers and submarines launched since 1907, gives the present naval strength of France:—Battleships: Dreadnaught, six; pre-Dreadnaught, three; battle cruises, *nil*; cruisers, six; light cruisers, five; flotilla leader, one; destroyers, fifty; submarines, forty-seven; airships, twenty; planes with service units, thirty-eight; planes in training units, sixty.—(Navy Parliamentary Secretary.)—*Army, Navy, and Air Force Gazette*, 24 March, 1923.

FRENCH NAVAL PLANS.—FUTURE CONSTITUTION OF THE FLEET.—Paris, Thursday.—The Naval Statute Bill, distributed in the Chamber today, does not provide for the execution of any particular measures, but establishes a theoretic or ideal constitution of the fleet similar to the law establishing the Army cadre.

The bill fixes the total tonnage of each class, while leaving the number of units to be decided subsequently in accordance with evolution of scientific theory.

The theoretic composition of the fleet laid down is as follows:

	Tons
Battleships	177,000
Light surface craft, cruisers, destroyers, and torpedo boats.....	360,000
Submarines	65,000
Aeroplane carriers	60,910

The report on the bill, discussing the rival claims of capital ships, light surface craft, and submarines, favors a judicious admixture of all three as indispensable in the present conditions of warfare.

It declares that the bill represents a considerable reduction compared with the size of the French naval forces in August, 1914, although the 1912 program was then far from completion. "Such reduction," it is added, "clearly exposes us to certain risks in future. It is because it was profoundly convinced that we ought resolutely to face those risks in order not to aggravate the difficulties of our financial situation that the Higher Council of the Navy has ratified this bill."—*Reuter*.—*The Naval and Military Record*, 28 March, 1923.

FRENCH NAVY NOTES.—The six 2,400-ton destroyers are well in hand, *Jaguar* and *Panthère* at Lorient, *Tigre* at Chantiers de Bretagne (Nantes),

Chacal (Dubigeon, Nantes) and *Leopard* and *Lynx* at Chantiers de la Loire, St. Nazaire. Expert opinion is unanimous in considering them as masterpieces of designing work and of fighting value. Their pleasing silhouette (one thick mast, three funnels), the well-studied distribution of their 130mil. guns and 22-inch torpedo-tubes, do not give the cramped and top-heavy impression which the sight of the ex-Boche *Senès* conveys to a trained observer. Sea-keeping qualities have obviously been looked after: the freeboard forward exceeds six mètres; the bows are yacht-shape, much overhanging. Three 5.2-inch guns will fire ahead, as the raised platform forward supports two weapons on a twin mounting that fires over the No. 1 gun. Curved armor shields protect the whole armament. The standard of structural strength is quite satisfactory.

* * * * *

Old "loup de mer" shake their heads when they picture the extremely long and narrow new *contre-torpilleurs* and *croiseurs légers* ploughing heavy seas at some 35 knots, when they see the flimsy plates of super-tensile steel that are covering delicate frames. The tragic fate of the British *Cobra* and *Viper*, that were on paper such masterpieces of work, is being quoted, and also the disappointing experience gained with the vibrating Bertin cruisers, exceedingly fast on paper and even for spurts in pond-like waters, but obliged to crawl at 12 knots in heavy weather. They remember the destroyer *Bouclier*, that reached 37 knots on trial and with trial load, but that started leaks as soon as she was pushed beyond 32 knots under service conditions. The greater the speed the more crushing the strain, and consequently the higher the standard of all-round robustness. Unfortunately, robustness is a too much avoir-du-pois virtue; it is incompatible with success in that thorough-going competition which destroyer and cruiser rivalry is more than ever.

Constructional experts whom I have consulted on the matter contend such fears are absolutely groundless, and for two main reasons: viz., Minute and painstaking experiments in laboratories, in trial tanks, and at sea in ex-German as well as in French boats have preceded the designing of the new *contre-torpilleurs* and *torpilleurs d'escadre* of 2,460 and 1,427 tons, the delays in ordering them being, as a matter of fact, due to the desire to obtain a superior standard of structural strength and also of motor reliability. Secondly, it is pointed out, the Germans and also the Italians have gone much further than the French, and without so many drawbacks in the way of piling up motor-power and armament on diminutive displacements. *C'est la voie du progrès*. The constructional art is getting more and more difficult, and international rivalry every day keener. To keep up with the times, and even to lead, is the only course left open to a navy desirous of conciliating a moderate expenditure with superior efficiency.—J. B. Gautreau in *Naval and Military Record*, 21 March, and 28 March, 1923.

GERMANY

TORPEDOES AND NAVAL MINES.—It is stated in Germany that during the war their submarines discharged about 5,000 torpedoes, of which number fifty per cent took effect. A high percentage of hits is claimed also for the torpedoes fired from destroyers and other surface warships. In the course of a recent article, a former *U*-boat commander states: "Rarely indeed did our torpedoes fail us. On comparing notes during and after the campaign, we found that not more than two per hundred were defective in the sense of running erratically, failing to keep their depth, or to explode on hitting the target. Further, our torpedoes were considerably more powerful for their size than those used by the enemy. This knowledge of the accuracy and destructiveness of our weapons gave us immense confidence in attack.

It was all the same whether we fired at extreme or at point-blank range—the torpedo was certain to run straight, to maintain its set depth, and to explode with stunning force when it reached the target. It was therefore unnecessary to allow any margin of error so far as the mechanical factor was concerned.” If the German torpedoes were superior to other types, it was because Germany had always paid marked attention to the development of this weapon and was not satisfied until it had been made as mechanically perfect as possible.

With the exception of a few purchased abroad from time to time for experimental purposes, all torpedoes for the Navy were manufactured in the Government factory at Friedrichsort, near Kiel, to which was attached a magnificently-appointed laboratory. Here experiments went on continually, each model produced being superior to the preceding one in range, speed, and power. As long ago as the nineties German torpedoes were remarkable for the weight of their explosive charge. They had a diameter of 17.7 inches and a warhead of 198½lb. of wet guncotton. Many of these old weapons were successfully employed by *U*-boats during the war. The torpedoes with which Weddigen, in the *U-9*, sank the three *Cressys* dated from 1905. All the 17.7-in. torpedoes of later construction were charged with 264½ to 330lb. of an explosive consisting of a mixture of T.N.T. and Hexa—produced by the Kruppamühle factory in Upper Silesia. This composition was at least thirty per cent more powerful than wet guncotton.

About the year 1906 the 17.7-in. model was superseded by the 19.7-in., with a warhead of 440lb. Most of the torpedoes fired during the war were of this type and very destructive they proved. In 1913 a specially heavy torpedo was designed for use in large warships. It had a diameter of 23.6-in. and carried 550lb. of explosive. This formidable weapon was first supplied to the battle cruiser *Lützow*, and later to a few particularly large destroyers. It was too heavy and bulky for use in submarines though plans for a *U*-cruiser with four 23.6-in. tubes were prepared, the idea being that this boat should attack enemy capital ships and no other targets. Another claim advanced on behalf of the German torpedo referred to the stability of its warhead. When the battle cruiser *Moltke* was successfully attacked in the North Sea by a British submarine the torpedo exploded in the torpedo-room of the ship, but in spite of the fact that three torpedoes lying there were broken up by the force of the explosion, not one of them detonated.

The old 17.7-in. bronze torpedo had a length of 15ft., which increased to 17½ft. in the improved model of that diameter, and to 23ft. and 29½ft. respectively in the 19.7-in. and 23.6-in. torpedoes, while the air pressure rose from ninety atmosphere to 175. The maximum ranges of German torpedoes in service or under manufacture at the outbreak of war were: 17.7-in. type, 6,000 metres; 19.7-in. type, 10,000 to 12,000 metres; 23.6-in. type, 15,000 metres. There was, however, no corresponding increase in speed. This would have been easily attainable by fitting more powerful engines, but it was found on experiment that the torpedo, when running at more than 36 knots, failed to keep its proper depth. Consequently a velocity of 35 or 36 knots was accepted as the maximum for all types. In 1918 a new model was produced, which would keep its depth when running at 40 knots, but only a few of these weapons were ready before the armistice.

During the war attempts were made to eliminate the upheaval of water which followed when a torpedo left the tube of a submarine, and which not only gave warning to the ship attacked, but tended to betray the presence of the submarine itself and expose it to depth-charge attack. Eventually it was found possible to cut off the air pressure in the tube as soon as it had fallen below a certain degree, and in this way to minimize the disturbance on the surface of the water at the moment of discharge; but the improve-

ment came to be used in the war. The electric "trackless" torpedo, which would have made submarine attack absolutely invisible, and therefore infinitely more dangerous, was being developed in 1917-18, and a few had been experimentally issued before the end of the campaign, but there are no details of their performance. Another war-time improvement was the fitting of a "lever pistol," which, projecting above the nose of the torpedo, would strike the hull of a ship and thus detonate the warhead even though the torpedo itself had passed somewhat below the target.

As regards quantity production, the highest output in time of peace was found, of course, to be quite inadequate for war requirements, and when the *U*-boat campaign was opening it looked as though a serious shortage of torpedoes would occur. The total number delivered in the year 1913 had been 193, but there was a fairly large reserve on hand at the beginning of hostilities. Measures were at once taken to increase the rate of production, and to such good purpose that in the month of September, 1918, no less than 774 torpedoes were delivered. The output had therefore increased forty-eight-fold in the space of five years. It is claimed that in spite of this rapid production there was at no time any falling off in the quality of the torpedoes. This, however, does not accord with the evidence of Allied naval and ships' officers, who state that in the second half of the war German torpedoes often ran badly, and not infrequently failed to explode on striking the target.

Next to the torpedo, Germany pinned her faith to the mine, a weapon in the construction and employment of which she excelled for the greater part of the war. Deadly as the first German mines seemed to be, it appears they did not satisfy the naval authorities, who demanded a more powerful charge, and the later models were therefore filled with 440lb. of T.N.T., or twice as much as the 1914 type contained. Quite early in the war British submarines caused so much trouble and annoyance in Heligoland Bight and off the German Baltic ports that it was found necessary to design a special type of mine for their benefit. This contained about 45lb. of T.N.T., and it was manufactured in large quantities, but does not seem to have been particularly effective in keeping our submarines at a distance.

Mine-laying by submarine was not a German innovation, though it is often claimed as such. As early as 1908 a submarine mine-layer was designed in Russia, and at least one boat of this class was in service before the war. It was not until September, 1914, that Germany began to build her first under-water mine-layers: viz., those of the *U-C* class. There is reason to believe that submarine boats for the laying of blockade mines had been designed in France and Italy previous to the war, and I am informed that plans for similar vessels had been drawn up in the United States in 1912, though none were actually built. Germany must therefore be given the credit of having produced the first practical submarine mine transport, and thus opening up a new field of mining tactics. Following the small *U-C* class, she built the *U71-80* series, of 755 tons, and then the nine big ocean-going mine-layers of the *U117-125* group, of 1,163 tons, which were specially designed for long-distance operations and proved fairly successful at this work.—Hector C. Bywater in *Naval and Military Record*, 4 April, 1923.

GERMANY BUILDING MOTORS FOR GIANT SUBMARINES.—Paris, April 6.—A giant submarine motor, which had been brought to a high state of mechanical perfection, was found in the Benz automobile works—a Stinnes holding—when French troops recently occupied Mannheim, according to a statement in the *Echo de Paris*.

The motor is of the Diesel type, capable of developing between fifteen and twenty thousand horsepower. French engineers who ran it seventy-two

hours continuously, pronounced its regularity of movement perfect. A number of smaller submarine motors also were found in the same factory.

Commenting on the find, the *Echo de Paris* says: "If Germany makes these prohibited motors only a few paces from France's military frontier one can only guess what other preparations for war she is making in the interior of the country. England cannot afford to be indifferent to this discovery, because it shows clearly that at the moment when the English are engaged in carrying out the terms of the Washington Arms Conference, Germany is far from renouncing her designs for war-time warfare."—*Boston Evening Transcript*, 6 April, 1923.

SPAIN

Although the finances of Spain are not in a flourishing condition and the campaign in Morocco is swallowing up a great deal of money, there has been no drastic curtailment of the naval program adopted in 1915, though its completion has been delayed both by shortage of material during the war period and various economic difficulties met with in the past four years. Thus, the battleship *Jaine I.*, laid down in 1912, was not finished till 1921, and the cruiser *Reina Victoria Eugenia*, begun in 1915, was nearly seven years under construction. This latter vessel, which resembles our *Town* class cruisers in design and general appearance, suffers from the handicap of low speed, her maximum performance on trial being 25.77 knots. She is, however, a good weatherly ship with moderate protection and an armament of nine 6-in. 50-cal. guns. Of smaller dimensions but greater speed are the *Don Blas Lezo* and *Mendez Nunez*, sister cruisers laid down at Ferrol in 1917. The *Lezo* went afloat last July, but no report is to hand as yet of the launch of the *Nunez*. Like the *R. V. Eugenia*, these two ships embody British principles of design to a marked degree, with certain modifications suggested by Spanish requirements. Except for the disposition of their guns, they might be copies of the British *D* class. They are expected to steam 29 knots at full power. The maximum oil supply of 840 tons is considerably less than that of our cruisers of about the same displacement. Of the six 6-in. guns carried only four can be worked on the broadside.

Work is shortly to be commenced at Ferrol on two cruisers of a larger and more powerful design, the names of which have not yet been announced. In dimensions and other features they are comparable to our *E* class. Their leading particulars are: length, 531½ ft.; beam, 53 ft.; displacement, 7,975 tons; speed, 33 knots. The armament is to be eight 6-in. guns, all on the center-line, six of the guns being twin-mounted, with an anti-aircraft battery of four 4-in. guns and twelve 21-in. torpedo tubes. These ships are understood to have been designed by Sir Philip Watts. Other vessels building are three flotilla leaders of 1,650 tons and 36 knots speed, carrying five 4.7-in. guns; three destroyers of 1,145 tons and 34 knots; four submarines, *Holland* type, of 610 tons; and three fast gunboats, of 1,335 tons and 18 knots. Six large submarines are to be commenced this year. When all these units are completed the Spanish Fleet will be easily first among the navies of the minor maritime Powers. But the Government's policy of spending so much money on naval construction has been severely criticized in the newspapers, which demand to know the object of all this activity in the dock-yards and arsenals. In proportion to her revenue, Spain, they assert, has the largest naval budget in Europe, though there is no perceptible threat to her sea interests in any quarter. If this criticism continues, the authorities may be compelled to effect a drastic cut in the shipbuilding program. In fact, it is already reported that a number of submarines have been cancelled.

The new Spanish cruisers have a fault which is common to all our own vessels of this type, as well as to those of Japan, namely, the absence of protection to their guns. It has been frequently remarked in these notes that the practice of mounting cruiser guns behind open shields is directly opposed to war experience, and any ship so armed must be considered inferior in fighting value to one that carries its guns in turrets or casemates. The United States has led the way by putting the entire battery of the *Omaha* class under armor protection; France has followed the same principle in her *Lamotte-Picquet* class, and Japan is understood to be adopting closed turrets for the new cruisers of 7,100 and 10,000 tons. This system means extra weight, but there can be no question as to its advantage from the tactical point of view. Two guns enclosed by armor are probably of more value than three devoid of such protection.—Hector C. Bywater in *Naval and Military Record*, 28 March, 1923.

JAPAN

NEW TYPE LIGHT CRUISER.—Among the Japanese light cruisers now building there is one of a new type, the design of which is of particular interest. This is the *Yubari*, laid down last year and due to be launched at an early date. As indicated above, all cruisers of the post-war program have been fairly large vessels, with excellent sea-keeping qualities and a wide radius of action. The *Kuma*, for instance, is capable of steaming 6,000 miles at 15 knots. But the *Yubari* is of 3,100 tons only, her other dimensions being:—Length, 435 ft.; beam, 39½ ft.; draught, 11¾ ft. The designed speed is 33 knots, and the armament six 5.5-in. guns, with four torpedo tubes. Judging from these particulars, the ship is an enlarged flotilla leader, but she may equally well be a mine-layer—a supposition the more plausible in view of her light draught.

NAVAL TALK UPSETS JAPAN.—Tokio, April 6.—Japanese public interest in naval matters has been strongly revived as a result of the Anglo-American gun range discussions and reports of the new American auxiliary program. Despite official expressions of confidence in the eventful ratification of the naval treaty a note of doubt is creeping into press comments concerning it. Admiral Sims's recent speeches, advocating a naval base at Guam and the strengthening of the Philippines defenses, has caused unfavorable comment, most Japanese failing to estimate the real weight of the retired officer's pronouncement.

A similar note was evident in the discussion of Assistant Secretary Roosevelt's recent statement on the Navy Department's intentions regarding auxiliaries and Secretary Denby's expressed desire to strengthen the auxiliary fleet to the proportion indicated by Secretary Hughes' original proposals. Two of the most influential journals comment editorially on the American naval situation, suggesting that nothing would deal a heavier blow to the Washington Treaty than evidence of American dissatisfaction or lack of confidence in it. The *Yomiuri* urges a new naval conference to discuss gun ranges, auxiliaries and Pacific defenses, suggesting that Japan and the United States cancel the Lansing-Ishii agreement conditional on Franco-Italian ratification of the naval and nine-power treaties.

"If America so acts as to cause a question as to her willingness to adhere wholly to the spirit of the Washington Treaty," it says, "world peace will be menaced more greatly than ever."

The *Osaka Mainichi* comments on the proposed American auxiliary program and naval base plans by declaring the navalists' propaganda in urging American fleet expansion causes other nations to doubt America's willingness to live up to the settlements she sponsored. A majority of the recent comments is marked by doubt as to the United States intentions, coupled with a desire that the naval treaty remain effective.—*Boston Evening Transcript*, 6 April, 1923.

UNITED STATES

A SUMMATION OF THE FLEET MANEUVERS.—Canal Zone, March 20.—The results attained in the working out of the naval problem in the recent maneuvers in which the Panama Canal was attacked as well as defended were reviewed today by Admiral Hilary P. Jones, commander-in-chief of the United States Fleet, for the benefit of Secretary Denby and members of the Congressional party brought to the Isthmus to make a first-hand study of the defenses of the canal.

The problem involved a theoretical attempt by a strong enemy naval force to establish a base on the Pacific Coast from which to make aircraft attacks aimed at the destruction of the great dam at Gatun and rendering the use of the canal impossible by an American Naval force despatched from Atlantic waters to destroy the enemy fleet. The answer, as worked out by the naval forces, was that an enemy force, under the conditions laid down, could make a landing at Culebra Bay on the coast of Costa Rica, a considerable distance north of the Pacific entrance to the canal, establish an aircraft base at that point and send bombing planes to the Atlantic side of the canal.

Weak Point in Panama Bay

In a separate frontal attack on the western terminus of the canal, undertaken at the special request of the army, the enemy fleet, commanded by Admiral Edward W. Eberle, commander-in-chief of the Pacific battle fleet, revealed that there is a point in Panama Bay from which an enemy fleet, once in control of the sea and air, would be able to attack with impunity Miraflores locks and fortifications guarding the Balboa end of the waterway. This weak point is within range of twenty-four of the 14-inch guns now in the Pacific battle fleet, and from that point Admiral Eberle's fleet was able to bring eighty-two other 14-inch guns to bear on the fortifications now existing at the western end of the canal while two battleships were attacking the locks. The present effective range of the guns guarding the western entrance is about 20,000 yards, so that a fleet stationed under a smokescreen at this weak point would lie beyond the range of the coastal fortifications.

This defect can be easily corrected by placing heavy guns on Toboga Island, which lies in Panama Bay, nine miles beyond the coast fortifications that are furthest out. The canal can also be made impregnable by following the recommendations made by Admiral Jones and by army officers in the Canal Zone. Both army and naval experts now stationed in the zone or serving with the fleet declare the air forces of the canal must be made stronger. President Harding will be asked to urge Congressional sanction for making the canal invulnerable.

Secretary Denby's party leaves Balboa with a feeling that the accomplishments of the United States Fleet in the nautical problems and maneuvers have justified the labor and money spent in bringing it together for the most comprehensive maneuvers held in the Western Hemisphere.

"The working out of this problem," said Admiral Jones, after Secretary Denby had presented him and Admiral Eberle to the Congressmen, "on the part of the battle fleet under command of Admiral Eberle was really in the nature of an overseas expedition and was of such a character as to bring rather a severe test on certain elements, notably the submarines and the destroyers. The two submarines detailed as decoys were required to make a trip of over 3,000 miles continuously at sea.

"In regard to the air force of the Scouting Fleet I need only tell of its accomplishments for you to realize the work done by the officers and men. Eighteen airplanes left Hampton Roads early in January and made the trip to Panama under their own power. In three days after their arrival all eighteen were out on the scouting line 200 to 300 miles up the west coast."

Lesson Learned from Problem

In his review of the problem involving the naval attack on the canal Admiral Jones gave a general outline of the motives, movements and conclusions. Later he will make a more comprehensive study of all the reports from the different commanders and draw up a complete résumé that will serve the Navy Department in a study of the proper defense of the canal. Admiral Jones stated that some of the benefits to be gained from working out of this could be summarized as follows:

"First—There are certain weaknesses in the Panama Canal. These are (a) susceptibility of certain vital parts to damage by bombs carried by aircraft; (b) grouping of coast defense artillery too close together to prevent attacking vessels which have once gained control of the sea and air from reaching positions that will permit firing on the Miraflores Locks; (c) lack of sufficient aircraft in canal defenses to insure immunity from attack by enemy bombers should a base be obtained within striking distance; (d) the necessity for more complete liaison between the army and navy forces, especially in communications, information concerning enemy forces and means for recognizing same.

"Second—The necessity for dissemination of information to our own forces. Where information is necessary or desirable in order that our own forces may act intelligently this information must be disseminated even at the risk of the enemy obtaining it.

"Third—The need for improving our fleet communications, both radio and visual.

"Fourth—The necessity for balancing our fleet by the addition of scout cruisers and destroyer leaders.

"Fifth—The necessity for having a sustained speed of at least twelve knots for fleet submarines and all auxiliaries that accompany the fleet.

"Sixth—The necessity for more maneuvers of this nature for fleet training.

"Seventh—The necessity of denying to any possibly enemy a base within aircraft striking distance of the canal.

"Eighth—The desirability of studying the question of establishing by suitable treaties aircraft base or bases at points within striking distance of the canal.

"Ninth—The necessity for looking ahead as to the probable and possible developments in submarines and aircraft.

"The performance of our eighteen seaplanes in making the long trip from Hampton Roads to the Canal Zone and the performance of our submarines in making the 3,000-mile trip from San Diego to the Canal Zone shows the possibility of a future enemy being able to bring to our shores both air forces and submarine forces from distances considered impracticable and the need for the further development of our own air and submarine forces."

"All of you gentlemen, being familiar with our own governmental policies and the international situation," Admiral Jones told the Congressmen, "undoubtedly appreciate that should another war come the Panama Canal is destined to play a most important rôle. The canal would undoubtedly be the objective for attack by any probable enemy so long as that enemy feels that there would be the slightest chance of success. This being conceded, it behooves the country to put the canal defenses on a plane that will insure defeat for any enemy who may attack."

Points in the Problem

In the canal attack problem the Scouting Fleet, formerly the Atlantic Fleet, under command of Vice Admiral McDonald had the task of defending the canal, and was known as the Blue fleet. The Battle Fleet, formerly

the Pacific Fleet, under command of Admiral Eberle, had the rôle of an enemy force. This was called the Black Fleet.

The general situation, known to the commanders of both fleets, was that strained relations between Black and Blue had recently been made more tense by a cruise of a Black Fleet in the Eastern Pacific. This Black Fleet, under command of Admiral Eberle, consisted of seven battleships, thirty-eight destroyers, two destroyer tenders, nine submarines and one sub-tender. After visiting ports on the west coast of South America, this fleet assembled on January 26 at Galapagos Islands, where they were joined by the Black base force with train, and by a number of fuel and cargo vessels under other flags. After repair and fueling, the entire Black Fleet, including base force and train, sailed from Galapagos Islands on February 16 with the announced intention to visit Magdalena Bay and Blue Pacific ports.

The Blue Government, in view of the threatening situation, had ordered the majority of the ships of the Blue force, which was superior to the Black Fleet, to Atlantic Coast yards, where the ships were undergoing overhaul preparatory to a southern cruise in March. The remainder of the active Blue Fleet had passed through the Panama Canal and was based on Balboa. This Blue force, under command of Admiral McDonald, consisted of eight battleships, twenty-six destroyers, one old cruiser, one destroyer tender, sixteen submarines, three sub-tenders, a mining force and an air force of nineteen planes. The Blue Army air force had been assembled in the Canal Zone. The Blue Submarine Divisions regularly assigned to the Coco Solo submarine base at the north end of the canal had been placed on a war status.

Information Known to Commanders

In view of strained relations, Admiral E had received instructions that in the event of war the general plan for the Black Naval Forces would be to take the "offensive-defensive," and that he was to render the Panama Canal useless through destruction of the locks or dam, or obstruction of canal or approaches.

While at the Galapagos Islands, Admiral E learned that a large Blue Air Force of scouting and fighting planes was at Panama about February 25, that it was common report that another destroyer squadron would arrive about February 19, and that two Black plane carriers, each carrying sixteen bombing planes, had left their base January 24 to join him. On February 18 when the Black plane carriers had joined him Admiral E received a radio despatch from the General Staff saying, "Execute your war mission. There will be no general declaration of war."

For the Blue commander there was given this special situation: Vice Admiral M, commanding fleet detachment at Balboa, the Commandant of the Canal Zone naval district and the Military Governor of the Canal Zone had been previously informed that the Blue Government was convinced that the purpose of the Black Fleet was to render the canal useless. Reinforcements had been ordered for the canal, of which fifty fighting planes, twenty observation planes and ten bombers were expected to be in the Canal Zone ready for service by daylight of February 25.

On the morning of February 17 Admiral M, the Military Governor and the Commandant of the Canal Zone received a dispatch from the Chief of Naval Operations and Chief of the Army General Staff informing them of the position of the Black fleet, that the situation was critical, and that the Blue Government had decided the presence of the Black Naval Force east of longitude ninety degrees west would be conclusive of hostile design against the canal, which must be frustrated. "On that basis act immediately to safeguard Panama canal" was the order.

The assumptions were that the Panama Canal was strongly fortified by heavy guns to a range of 20,000 yards and by six-inch guns and smaller caliber to a range of 12,000 yards from the line Tobago Island to Flamenco Island, that Blue land forces in the Canal Zone consisted of 10,000 troops, fifteen observation planes, four mine-layers and 1,000 controlled mines, and that Blue naval district forces in the Canal Zone consisted of sixteen submarines, six tugs, twelve motor boats and ten observation planes.

Galapagos Islands and Cocos Island were denied to the Black fleet and their use prevented by neutral nations, but the Central and South American countries in the vicinity of the canal were assumed not to be able to effectively resist Black use of a Pacific Coast base in their territory.

Air Attack Decided Best

In drawing up their estimates both commanders considered the possibilities of blockading the canal by an attack in force on the Pacific side defenses and locks. Blue rejected this idea as improbable on Black's part, believing the heavy fortifications would keep his ships at bay, and even should he reduce these he would still have a mine field, a submarine entrance guard and an air attack to overcome. Black rejected this course because he thought that to destroy the closest locks by bombardment or torpedoes ships would first have to destroy the Blue sea forces, run the gauntlet of the mines and submarines in Panama Bay, and even after this was done shore batteries would still keep Black forces, he believed, at a range of 36,000 yards, to which distance destruction of the locks by bombardment was considered hardly possible.

After consideration of the blockading of the canal entrance by sinking ships, both the Black and Blue commanders estimated that the best chance for Black to accomplish his mission was to bomb the vital parts by means of airplanes. Blue decided that Black's most probable intention would be to establish a base on the Central or possibly South American coast. The Black commander came to the same conclusion. Culebra in Costa Rica was chosen for the Black base. It is 550 miles by water from the Pacific entrance to the canal. By air line across the mainland of Costa Rica it is 350 miles to Gatun Dam. By way of Lake Nicaragua and the San Juan River Valley it is 385 miles from the dam. Planes with 800 miles radius could make the round trip by following this route.

Black decided to launch the surprise attack from a protected anchorage at Culebra Bay by flying from that point to the Gatun Dam and spillway. If the Gatun Dam were damaged, the Black commander decided, the canal would be put out of commission for a longer period than if the locks were damaged, as a break in the spillway or Gatun Dam would empty Gatun Lake, and even after the dam was repaired it would take a long time for the lake to fill so the canal could again be used.

The Blue commander reported that on February 20, not having sighted the enemy, he decided that the Black force would approach the coast either by the southern flank or on the northern flank. So he sent a radio to the commander of the Blue destroyer fleet to send six northern scouts immediately to examine the coast as far north as Fonseca Bay. This resulted in the first sighting of any of the enemy forces on February 21 about forty miles off shore. That afternoon the Blue destroyer *Coghlan* reported the enemy entering Culebra Harbor.

During this interval six northern Blue destroyers were concentrating and three submarines were moving toward this area from Salinas Bay. One of the Blue airplanes claimed to have bombed the *Oklahoma* and one of the Blue submarines to have torpedoed two of the Black battleships.

When the Black forces arrived at Culebra the problem was discontinued. The Black fleet arrived off Culebra within the limit of time contemplated

in its plan. When the problem was discontinued the Black force was securing itself at its base and making preparations for the flight of the bombers to Gatun Dam and spillway.—*New York Times*, 8 April, 1923.

THREE MAIN LESSONS FROM PANAMA MANEUVERS.—By Frederick C. Hicks, Representative from New York, Member Naval Affairs Committee.—The maneuvers of 1923 are over and are now a part of our naval records. For the first time in the history of the United States Navy our sea force, united under one command, has worked battle problems and fleet tactics. Fifteen of our dreadnaughts and some seventy destroyers with submarines and auxiliary craft, composing the Atlantic and Pacific fleets, have operated as one fleet. Great credit is due Admirals Jones and Eberle and all the officers and men for the successful manner in which the operations were carried out. As details of the work have been published in press reports, I will endeavor to point out the chief lessons learned and present the arguments in favor of a continuation of our present naval policy. Three points stand out prominently.

First, the necessity of making these maneuvers a part of our naval practice. In order that the fleet may operate smoothly and effectively, with each ship in proper position, it is of prime importance that these joint maneuvers be held at frequent intervals, for it is only by actual practice in peace times that experience will be gained which in war times would enable the fleet, acting as a unit, to fight at the maximum of its power. Problems may be solved on paper; great operations may be successfully executed in theory, and while this class of experiments has its value, yet it is only by working the ships themselves in fleet formations and under conditions approximately those of battle that a high degree of efficiency can be attained.

Lack of Practice Shown

While the maneuvers were entirely satisfactory, there was a raggedness, due to lack of practice, which, if repeated in actual conflict, might lead to disastrous results. To bring the fleet up to the highest point of efficiency, to accustom officers and men to work their individual ship as an integral part of a greater unit, it is therefore essential that maneuvers of this character be held frequently.

To accomplish this result, it is necessary that ample supplies of fuel be provided. This involves the appropriation by Congress of funds for the purchase of large stocks of oil and coal. While the amounts involved are naturally heavy, the objective is of such vital importance that it fully warrants the expenditure and our national legislators should not hesitate to vote the funds.

The second outstanding feature was the lack of light cruisers. This type of vessel is absolutely essential for a well-balanced and properly rounded out navy. At present we are deficient in these ships while Great Britain and Japan are both amply supplied with them.

The functions of a cruiser may be described as follows: First, the service of information, scouting; in other words, searching for the enemy fleet and finding out what it is doing. Second, screening; that is, guarding our fleet against surprise and keeping off the enemy scouts. Third, in battle, supporting our destroyers in their torpedo attacks against enemy battleships and beating off enemy destroyers. Fourth, operating against enemy shipping and protecting our own shipping against enemy raiders.

Need of Light Cruisers

Of modern cruisers of 3,000 to 10,000 tons, the construction of which are permitted by the treaty without numerical or total tonnage limitation, the United States is building ten to have a speed of over thirty knots and a

total tonnage of 75,000, while the British have or are building to a total of forty-eight with an aggregate tonnage of 252,990, and the Japanese twenty-five with a total tonnage of 157,730. This disparity between our cruiser strength and the cruiser strength of the other powers should be corrected by the laying down of additional ships. This will accomplish two purposes:

First, it will give to the present fleet a strength in cruisers proportionate to the capital ship strength permitted by the treaty under the ratio agreement and add that element of strength which the navy now lacks.

Second, by possessing a large number of cruisers, it will enable us in case a conference is called for the limitation of auxiliary combat ships, to obtain a ratio of equality with any other power. Undoubtedly ships in hand will be used as a basis for determining this ratio, and so it is imperative that we build up our cruiser strength as we built up our capital ship strength under the 1916 program.

Secretary of State Hughes said in his New Haven speech:

"Personally, I am strongly in favor of maintaining an efficient navy up to the treaty standard. This does not involve any injurious competition in battleships, but simply makes possible the work and equipment which maintain the security and relative position contemplated by the treaty. There is another reason for this course. If we enter another conference, we should have an assured basis for a proper agreement by maintaining our existing relative strength. We have established a fair ratio based on existing strength as it stood at the time of the conference, and this ratio should not be altered to our prejudice. As to light cruisers, the United States is not as well supplied as it should be, but the treaty does not interfere with adequate provision by the United States to supply this want, and it should be supplied."

Third, the necessity of having an enlisted personnel of sufficient strength to man every station on board ship. Owing to lack of training ashore, it frequently happens that a ship must carry a number in excess of her complement, which means loss of man power. This is due to rapid flow of men through the service; at the present time the re-enlistments average only about sixteen per cent, so the navy must constantly take on new men. A constant shifting of crews is always a detriment and it is hoped that this defect may be overcome by a change of the existing enlistment law.—*New York Times*, 15 April, 1923.

THE NAVAL DANGER AT PANAMA.—The ominous drone of a double-engined night-bomber flying over the Gatun locks would be the first news to Americans guarding the Panama Canal that war had been declared on us by any foreign country. This is the opinion of Major-General Samuel D. Sturgis, in command of the military defenses of the Canal Zone, in a recent interview given the representatives of various newspapers present at Balboa.

The immediate occasion for this disquieting revelation, we are told, was the recent naval maneuvers at which two attacks made on the Canal would have resulted (in actual war) in its being crippled for a period of years. One of these was when the "Black Fleet," representing the mythical enemy, slipped by the defensive fleet and reached an anchorage in Port Culebra, north of the Canal on the Coast Rican coast. This fleet was supposed to have two large airplane carriers which could then have easily dispatched their 150 planes along the Nicaraguan Canal route to the Atlantic, down to the Atlantic entrance of the Panama Canal and over the Gatun locks. It has been pointed out that several navies of foreign Powers have sufficient airplane carriers and planes to make such an attack. The results of the maneuvers are said to have been a shock to Secretary of the Navy Denby, Admiral Coontz and the visiting members of the Senate and House.

The force of this conclusion is brought home by Carter Field, writing in the New York *Tribune* of the Canal's air defenses:

"There is not a fighting plane now in the entire zone. At present, with no fighting planes, there are only sixteen observation planes and four bombers. There should be more of both, as well as fighters, in the opinion of Army and Navy experts.

"The anti-aircraft gun defenses are in pitiful shape. There are only thirty-six guns mounted on the sixty-six locations considered vital. The Army has the guns, but not the men.

"More than that, there is not a searchlight stationed near an anti-aircraft gun except in the forts defending the two entrances. Yet the most simple possible attack by hostile aircraft would be not on these forts, but on the locks, the smashing of which would cripple the Canal."

Concrete suggestions from military experts include:

1. Replacing one obsolete 16-inch gun on Perico Island at the Pacific entrance of the Canal, with two 16-inch guns.
2. Four other 16-inch guns on Taboga Island, eight miles further out in the Bay of Panama, to guard the approach.
3. Four 16-inch guns on the Atlantic side to guard the entrance as well as Gatun Locks, nine miles inland.
4. One hundred to 150 scouting and bombing airplanes with the necessary personnel to maintain them for defense.

Interviews given out by General Sturgis to the Chicago *Tribune*, New York *Tribune*, New York *Herald* and other papers summarize the situation from the Army as well as the Navy point of view. We quote from the New York *Herald*:

"The result of this defense will be to establish an intermediate zone at the canal mouth to protect the American naval force going out to meet the enemy. Without such protection the enemy in a T formation outside the range of our present guns could pick off ship after ship as she emerged from the Canal."

Widely varying views were expressed by our newspapers. The New York *World* takes the information somewhat ironically:

"It is a terrible catastrophe to contemplate. The only way of escape seems to be through unlimited appropriations. But even before that can be done it will be necessary for everybody to work himself into a state of panic over the Panama Canal."

At any rate no one can accuse Americans of thinking in terms of war, points out the Milwaukee *Sentinel*, since it is now obvious that the United States is taking much greater risks than any of the other signatories to the disarmament treaty. For:

"The defensibility of the Panama Canal, making it possible for the American fleet to act as a unit, is the basis of the five-five-three ratio. If the canal is 'by no means a Gibraltar,' such a danger evidently upsets the naval ratio."

Perhaps the greater number of editorials arrive at some such conclusions as this of the Philadelphia *Inquirer*:

"There is not yet a sufficient realization, even among military and naval authorities, of the overwhelming part that aircraft will play in the battles of the future. We still talk of preparation in terms of ships and land guns. They are not obsolete by any means. But it is becoming more and more plain that the first line of attack or of defense hereafter will be in the air."—*The Literary Digest*, 14 April, 1923.

SIDELIGHTS ON AMERICAN NAVAL POLICY.—A candid and well-informed exposition of American naval policy is contributed to the March number of the *Fortnightly Review* by Mr. William H. Gardiner, vice-president of the Navy League of the United States. It appears that an article by

Mr. Archibald Hurd, in a previous issue of the *Fortnightly*, containing observations on the Washington Naval Treaty and its effect on the future relative position of the leading navies, has given rise to adverse comment in the United States, where it is held to have misinterpreted the original American proposals for naval limitation and inaccurately pictured the post-Conference programs of auxiliary men-of-war. The present article is, therefore, in the nature of a reply to Mr. Hurd, though occasion is taken to explain and justify the whole trend of recent American policy in relation to sea armaments. Incidentally, Mr. Gardiner mentions, and disposes of, a suggestion heard "in certain quarters" that the big ship-building program adopted by Congress in 1916, consisting as it did mainly of capital ships and making no special provision for anti-submarine craft, was designed with a view to helping Germany. This is the first we have heard of any such strange suggestion, and we are certain that it never occurred to any rational person in England. It is true that President Wilson, in February, 1917, speaking of the Great War, remarked to a Cabinet colleague that "he (the President) didn't wish to see either side win—for both had been equally indifferent to the rights of neutrals—though Germany had been brutal in taking life and England only in taking property"; but however much we may disagree with Mr. Wilson's policies, no one on this side of the Atlantic credited him with a desire to see Prussianism triumphant, much less with an intention to give it the support of American arms.

Mr. Gardiner makes it clear that for some years past the eyes of American strategists have been fixed on the Pacific, not on Europe, and that they take a far graver view of the possibilities of eventual conflict in the Far East than has been realized in this country. This helps to explain why the Anglo-Japanese alliance caused so much uneasiness in the United States, and why the prospect of its renewal led to some very plain speaking by the American Press. We are told that, Lord Curzon's proposal for a formal renewal of the alliance having been "virtually vetoed" by Mr. Meighen, the Canadian Premier, the British Government was saved from "the dilemma of having to choose between breaking with Canada over a major matter of foreign policy or breaking with Japan" by the American invitation to the Washington Conference. Unless we are greatly mistaken, however, the renewal of the Japanese alliance was in doubt long before Mr. Meighen had spoken of it or the American Government had resolved to summon a conference. There was a widespread feeling here that the alliance had outlived its utility, and an influential section of our own Press was calling loudly for its termination. But if the British Government was in a dilemma, so also was the American, on Mr. Gardiner's showing. "On the one hand, there was a most positive demand for retrenchment in American federal expenditure, and there was emotional clamor for disarmament, such as has followed every great war supposedly fought to end war. On the other hand, there was detailed, specific, and conclusive evidence of a technical nature that intensive preparations were being made looking to war in the Pacific in 1924." Thus the American Government's dilemma was "between the fiscal and pacifist aftermath in the United States of the European war, on the other hand, the specific imminence of a Pacific war on the other." We believe that this American writer does not exaggerate the acuteness of the Far Eastern situation in 1921, though most of us here were too preoccupied with our post-war problems to realize what was brewing on the other side of the globe.

Coming down to the main issue between Mr. Gardiner and Mr. Hurd, this refers to the scope of the initial American plan of naval limitation, which, according to Mr. Hurd, did not go beyond capital ships and aircraft carriers. In fact, however, the plan embraced all types of fighting craft, and was only narrowed down to big ships after it had become evident that an agreement could not otherwise be reached. Credit is certainly due to the

American Government for having proposed a comprehensive and sweeping reduction of all naval material, from dreadnaughts to submarines. The other of Mr. Hurd's statements now challenged was as follows: "The only countries which have laid down such vessels (cruisers and submarines) since the end of the war are the United States, which has a large program in hand, Japan, France, and Italy, but the last-named countries' programs are extremely modest." It is evident that a slip of the pen occurred here, as Mr. Hurd cannot but be aware that the Japanese post-war program, so far from being "extremely modest," is decidedly ambitious. That country, indeed, is now engaged in building more cruisers than all the Powers combined, and has laid down eight such vessels since the Conference ended, while her submarine construction is on an equally generous scale. When we find that during the last five years she has built or ordered twenty-three light cruisers, as against a collective total of sixteen for Great Britain and the United States, there can be no question as to which country is setting the pace in "auxiliary" naval construction. In affirming the natural and desirable alignment of the American and British navies to be side by side, Mr. Gardiner expresses a sentiment with which we in this country cordially agree. Sympathy and co-operation between the two nations form the strongest guarantee of future world peace.—*Naval and Military Record*, 14 March, 1923.

MERCHANT MARINE

NEW SHIPPING BOARD POLICY.—A new shipping policy based upon the determination of the Administration to keep the American flag on the seven seas—either by sale of existing Government ships and routes to private operators or by direct Government operation and ownership—was enunciated both from the White House and the Shipping Board today.

From the White House came the announcement that after conference with the Shipping Board the President has concurred in the program that "the chief end to be sought is the establishment and maintenance of an American merchant marine." The White House announced that with the failure of the Administration's Ship Subsidy bill the Shipping Board has on its hands its vast possessions of ships as well as heavy losses under the present plan of allocated operations by managing agents.

If these managing agents will turn to now and buy the Government vessels and guarantee to maintain service the Government is willing to go out of the shipping business. If these potential purchasers hold aloof and fail to make satisfactory bids, then the Government, with an available appropriation of \$50,000,000 for ship operations in the next fiscal year, will operate its own ships and a year or two from now ask Congress to define a national shipping policy.

Meanwhile, so far as the resources and appropriations in hand go, the Administration intends to keep the American flag afloat on the seas.

President Harding's statement was supplemented with details in a conference Chairman Lasker had with newspaper correspondents afterward. Succinctly, the Administration program is this:

The President, Chairman Lasker and the Shipping Board long have been opposed to outright government operation of ships, but they will adopt this plan rather than see the American merchant marine die because of failure of the Ship Subsidy bill in Congress, or the failure of American operators to bid for vessels.

Chairman Lasker thinks the Shipping Board has too many routes under the arrangements with agents. Operating agents originally numbered about eighty; Mr. Lasker reduced the number to thirty-nine, and he thinks eighteen to twenty-five would suffice.

Trade routes and ships and these reduced number of agencies are to be offered for sale, but if these "potential customers," who have been operating do not fulfill the bidding expectations of the Shipping Board, then the Government will call everything quits and run its own lines of cargo ships. Passenger routes are incidental and not materially involved.

Preceding Chairman Lasker's explanation of its fuller meaning, the White House issued a statement after the Shipping conference. About a year ago the President indicated his disapproval of rolling up further deficits in shipping operations, but it appears today that the Administration is willing to make an exception so far as the appropriation for the next year is concerned.

The White House statement reads:

After an extended conference with the full membership of the Shipping Board and a thorough discussion of the problems to be solved, the board unanimously agreed, with the President's concurrence, that the chief end to be sought is the establishment and maintenance of an American merchant marine. With the failure of the Subsidy act the board is confronted with its vast losses under the existing plan of allocated operations under managing agents.

In compliance with the shipping act the board will proceed at once to the consolidation of foreign trade lines, and then offer the sale of these lines and ships under the authorization of the law, conditioned on suitable guaranty of maintained service. If such sales cannot be made without justifiable sacrifice of the ships, then the Government will proceed to direct Government operation aggressively pursued. In short, there is unanimous agreement that the existing law contemplates and authorizes an adequate and maintained American merchant marine, and such a course will be followed as will fully guarantee it and contemplate its larger development.

Will Not Sell Cream of Routes

Elaborating upon the White House statement Mr. Lasker said:

"If within the next few weeks we cannot get satisfactory offers from the private operators we have encouraged as potential customers—and we do not mean to sell three or four cream routes and leave the Government holding the bag as to the rest—we shall carry out the program of government operation and answer the question 'how shall America stay on the high seas?'"

"Nobody hates Government ownership and operation more than I do. I have been consistently against it and so has the board and the President, but the board and I finally have recommended in view of the present situation that we cut out doing business on the cargo lines through agents and go direct and on a larger scale to Government operation.

"We feel that if we cannot sell our ships with guarantee of service to operating agents whom we regarded as potential customers, then the alternative is Government operation, because, after all, the main thing is the maintenance of an American merchant marine. We do not intend that the American flag shall go off the high seas.

"Congress refused a subsidy to private shipping. You all know the history of that fight and how the Administration and I believed it was the solution to the shipping question. However, while it failed to approve the so-called Ship Subsidy bill, Congress did appropriate after only a few minutes' debate \$50,000,000 for the operations of the Shipping Board for the next fiscal year, beginning July 1. We have that \$50,000,000, and intend to use it to keep the American flag afloat, and for the first time to put into effect an aggressive campaign of ship operation by the Government.

"The President and the Shipping Board are determined to use this opportunity to the end that America shall not only be free on the seas, but shall adequately play its part in the commerce of the world.

"All shipping companies, under any flag, seem to be losing money now, but this Government cannot leave the seas to foreign competition. I want to say that no service now given by our operators will be interrupted if it becomes necessary for the United States to take over operation of its own account. . . .

"The point I want to make is this—that so far as American and foreign shippers are concerned and so far ahead as anyone can see in this generation it will be possible to ship on American vessels."

Mr. Lasker said that Shipping Board's direct appropriation of \$50,000,000 for the next fiscal year would tide it over that period of Government operation, if the Government must go whole-heartedly into the shipping business, because the operators would not purchase its vessels, and he admitted the outlook seemed poor for purchase. Outside of that, he said, the Shipping Board would go to Congress next December and ask for a construction appropriation to put more specialized cargo ships into operation. However, he said, this appropriation was not vital and the board could get along, although the appropriation was desirable.

Chairman Lasker plainly indicated that American vessels would not be sold at a sacrifice. Rather than that, he said, the Government would go into the business of operation on a large scale. He also suggested that a year or two of Government operation might do two or three things, including stabilization of the shipping business and the convincing of foreign nations that the American flag is not to be driven off the seas despite the defeat of the Ship Subsidy bill.

Willing to Settle at Market Price

The Government is willing to sell at "market price" any of its vessels with maintenance of service guaranteed, Mr. Lasker said. He recited that twenty-three oil tankers of the few hundred of tankers in service have been sold unconditionally at market price within recent months. However, operators who buy at less than market must give guarantees.

The Shipping Board chairman admitted that preliminary reports about the intention of "potential customers" to purchase the ships they had been operating were pessimistic. He hoped the ships would sell, but added that "the bids of the next thirty days will tell the story."

The operators, he said, might be bluffing. If they are not bluffing and intend to hold aloof as bids are called for, then, Mr. Lasker said with approval of the Administration, the United States, under the authority of the Jones bill and the \$50,000,000 already voted by Congress, will go ahead and really begin government operation of a merchant marine and keep it up until a national shipping policy is enunciated by Congress or the American nation determines that it wants to get off the seven seas.

Later Mr. Lasker said that in the event the Government finds it necessary to embark on a straightout program of Federal Operation, the Shipping Board would be prepared to go before Congress in December and ask a substantial appropriation for replacement construction.

The chairman made it plain that in the plan considered by the conference today an important feature was provision for new tonnage, built in American yards, to maintain a surplus, "as a notice to competitors that the American people intend to keep at sea."—*Baltimore Sun*, 15 April, 1923.

OUR SHIPPING MAKING PROGRESS.—The recent conferences held in Washington at the instance of the Shipping Board's Policy Committee revealed that our shipowners and shipbuilders are still of the opinion that, without some form of Government aid, no privately owned American merchant marine of any size can be established on an enduring basis. Under existing conditions it is difficult to prove or refute the correctness of this as-

section. On account of the preemption of the field by and the withering competition of Government tonnage, American privately owned vessels have been unable to establish themselves on the trade routes of the world. One fact is certain, however: that our merchant marine has been forging ahead for the past year without any direct Government aids and despite the existing acute shipping depression. The turn in the tide occurred in March, 1922, since which month the proportion of our water-borne commerce carried in American bottoms has risen almost uninterruptedly. According to the latest available tonnage statistics, thirty-eight per cent of our combined imports and exports in November last were carried in American ships, as compared with only thirty-two per cent in the corresponding month of last year. Again, American vessels entered and cleared at United States ports in the foreign trade totaled 6,643,988 tons in November, 1922, as against 5,721,879 tons in the same month of the year preceding. Both actually and relatively, therefore, our shipping is making distinct progress. All this is very gratifying to those who believe that given a fair opportunity and freed from vexatious restrictions, American-flag vessels can compete successfully for a goodly share of the overseas carrying trade even though denied help from the Government.—*Nautical Gazette*, 14 April, 1923.

ENGINEERING

ELECTRIC SHIP PROPULSION.—The paper by Mr. W. Le Roy Emmett on "Electric Ship Propulsion," taken on Thursday afternoon, the twenty-second ult., and read in the absence of Mr. Emmet by Mr. Bevis P. Coulson, Jr., opened up another discussion. See *The Engineer* for 6 April, 1923.

Engineer Vice Admiral Dixon said that the application of electric propulsion to warships had not been overlooked by the British Admiralty, but the decision had been reached that the case for electric propulsion had not been established. With regard to the claim for improved economy of operation, that was not the first consideration in the case of warships, and it was obvious that the installation of machinery of greater weight must lead to disadvantages from other standpoints unless the additional weight occupied by the machinery was counterbalanced by a corresponding saving in the weight of fuel carried. Experience in the British Navy indicated that the geared turbine could, for all practical purposes, be made as efficient as electric propulsion. The question of the extra space occupied by electric machinery, which had not been dealt with by Mr. Emmet, was a vital consideration in the case of a warship, the design of which was a compromise between opposing factors, and where every foot of space had to be most carefully considered, as it might mean the sacrifice of an important fighting or defensive feature. It would seem that electric transmission plant, as compared with the geared turbine drive, required an additional floor space of not less than twenty per cent. It was true that against that it was argued that electric transmission enabled a greater subdivision to be made of the machinery, but from the naval standpoint the advantages claimed under this head were more apparent than real. It could be said in favor of the geared turbine that it had come with a successful record out of the trial and stress of the naval war, and although the advance of electric propulsion for ships would be watched with interest and taken into consideration when new ships were being designed for the Navy, in its present stage of development it would seem that its disadvantages outweighed its advantages in the case of warships.

Sir Thomas Bell said that Mr. Emmet was to be congratulated on his courage in embarking on the wholesale manufacture and intensive production of machinery, of which he had had no very definite or extended ex-

perience. The firm with which he (the speaker) was connected had fitted double reduction-gearred turbines in three large passenger ships which had been in service for some time, and in two other passenger steamers had installed single reduction-gearred turbines. Their experience had been satisfactory, and from knowledge of performance gained under service conditions he took exception to the statement of the author that low-speed turbines could be more safely and easily operated through gearing than high-speed turbines. He was unable to see what advantage in the case of passenger ships could be claimed for electric propulsion.

Sir Eustace d'Eyncourt said that having regard to the conditions which were laid down by the Washington Conference any economy arising from the adoption of the electric drive, which might be associated with cruising speeds was of no importance, while it was clear that the extra weight of electrical machinery as compared with geared turbine plant must reduce the fighting qualities of the ship. Reference had been made to the additional space required for electrical plant, and it had been found in a provisional design which had been got out for a warship, that to compensate for the extra space required it would have been necessary to encroach considerably on the magazine space, which, of course, put electric propulsion out of court.

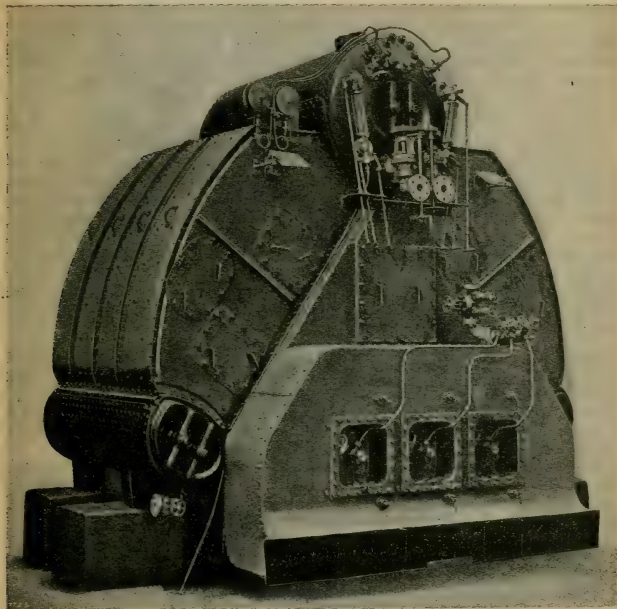
Mr. Robert J. McLeod said that at the beginning of last year he had made a visit to the United States and had been given an opportunity of inspecting the electrical equipment of the newer battleships and cruisers, and of discussing the whole question with American naval officers. He had also spent some time with Mr. Emmet and the engineers of his company at Philadelphia and Pittsburg. He was able to say that every naval officer in the United States service was enthusiastic on the subject of the electric drive for warships, and he had heard of none of those troubles such as were associated with mechanical gearing. If he might suggest an explanation of the small percentage of failures of gearing in warships as compared with merchant ships, it was that while warships ran only occasionally at full power, merchant ships were driven at full speed for the greater part of the time they were at sea, and the stresses on the gearing were, therefore, of a continuous character. The weight and space question had been raised in connection with the electric drive, but he would point out that in the United States they had designed their new ships from first principles, and reduced the machinery weights to a greater extent than might seem possible to those who had only a cursory knowledge of the subject. He would like a definite comparison by British engineers who were opposed to the electric drive to show what they could do to compare with the hypothetical ship laid down by Mr. Emmet. It could not be disputed that with the electric drive boilers and generators could be placed in a more convenient position in the ship. The question of reversing was of some interest in connection with the electric drive, as reversing could be carried out more simply, and it was an advantage that a higher degree of superheat could be used with the electric drive and turbines always running in one direction than in a system which made the use of reversing turbines necessary. He had come to the conclusion that the geared turbine must be less efficient than the electric drive. The work done in the United States had proved the greater reliability of this system for large ships owing to the plurality of the units. Personally, he had very little doubt as to the future of the electric drive, and he was the more convinced of its superiority to any other system from the fact that the cost of upkeep of the electrical equipment in the United States warships had been practically negligible. He would like to see two sister ships built, one fitted with the electric drive and one with the geared turbine, and a series of comparative tests carried out.

Commander S. V. Goodall said he had been at sea in the *New Mexico*, the first electrically-propelled battleship, and he had been all but persuaded of the superiority of electric propulsion as compared with geared turbines. At that time the fuel consumption for the battle cruisers of the *Lexington* class, which was guaranteed by the contractors, varied from .98 lb. of oil per shaft horsepower per hour at full speed to 1.20 lb. at 19 knots, these figures being the consumption for all purposes. Mr. Emmet was now prepared to guarantee a figure of .85 lb. at 19 knots and full speed, but even this great improvement in fuel consumption did not establish the case for electric propulsion in warships, as the saving in fuel did not compensate for the increase in machinery weights. Taking Mr. Emmet's figures he had worked out the effect on the recently scrapped battle cruisers of adopting electric propulsion. A veritable rake's progress was the result. The engine rooms had to be longer, the horsepower increased, the weight of armor therefore increased, and the size of ship increased. Calculations showed that the vessels would have been 50 ft. longer, the light displacement higher by 3,500 tons, and as the result it would have been impossible to dock the ships at either Portsmouth or Rosyth. He had also worked out a scheme of electric propulsion for the new capital ships *Rodney* and *Nelson*, and found that the ships would be 20 ft. longer and the displacement 1,000 tons in excess of the limit fixed by the Washington Treaty. It was obvious that unless the weight and space of electric machinery could be very much reduced, the death blow to electric propulsion for warships had been given by the Washington Treaty.

Mr. Bevis P. Coulson, Jr., in replying on behalf of the author to the points raised in the discussion, admitted that weight and space questions were of great importance and required to be discussed in detail. There was no doubt that electric propulsion was gaining ground. Following the construction of the *San Benito*, a 3,000 shaft-horsepower ship, equipped with electrical machinery, three vessels of the same type had been ordered by the United Fruit Company. The Japanese Government had just taken delivery of an electrically-propelled collier, and he felt confident that the electric drive would be generally adopted in the Japanese Navy. Comparisons were available of the electric drive with the geared turbine. It had been shown in regular trials that the maneuvering qualities of the *New Mexico* were vastly superior to those of the geared turbine ships *Idaho* and *Mississippi*. The fuel consumption of the geared turbine ships also compared unfavorably with that of the *New Mexico*. At 10 knots they consumed twenty per cent more fuel, at 15 knots, forty-two per cent more fuel; at 16 knots, forty-seven per cent more; at 19 knots, forty-per cent; and at 21 knots, thirty-two and two-tenths per cent more fuel. Reference has been made to the weight question. If an Atlantic liner similar to the *Empress of Canada* were taken, it would be found that the large double-reduction gears weighed 200 tons, which was about 37 lb. per shaft horsepower, and the weight did not include the four turbines. Electrical equipment would compare favorably with that figure. On the question of the space occupied, he was able to state that in the case of the *California* the machinery spaces had been narrowed to a degree which enabled 300 tons to be saved in armor plating. On the weight question, he would also point out that there was a big saving in piping with the electric drive as well as a saving in shafting, as the motors could probably be put nearer the stern of the ship. In America they were convinced of the advantages of the electric drive, and could not understand the objections which had been raised by British engineers. Unfortunately, or fortunately, as the case might be, it would not be possible to test the fighting qualities and military advantages of the electric drive compared with other methods of propulsion, unless there was a war between Great

Britain and America, and he prayed that that might never happen.—*The Engineer*, 6 April, 1923.

YARROW WATER-TUBE BOILER WITH KERMODE SYSTEM OF OIL-FIRING.—An interesting installation of the Kermode system of oil fuel burning is illustrated in the figure below, which shows a Yarrow water-tube boiler fitted with three Kermode pressure jet burners, each of which is carried in an independent air-control casing. The boiler, which has 2,000 sq ft.



Yarrow Water-Tube Boiler

of heating surface, a working pressure of 200 lb. per square inch and an evaporative capacity of 18,000 lb. an hour, was constructed and equipped as shown in the figure by Messrs. Wm. Denny and Brothers, Limited, of Dumbarton, and is fitted to a fire and salvage boat built by Messrs. Merryweather and Sons, Limited, of Greenwich, for the Port Authorities of Rangoon. The dimensions of the vessel are 109 ft. 6in. overall by 20 ft. beam by 8 ft. 6 in. depth, and the draught is 6 ft. 6 in. The propelling machinery consists of two sets of triple-expansion engines with cylinders 10 in., 17, and 26½ in. diameter by 16 in. stroke, capable of developing 800 i.h.p., and driving twin screws. A speed of 13-18 knots was obtained on the sea trials as a mean of several runs over the measured mile,

although the trials were carried out in very bad weather with a heavy gale blowing. This speed was 1.7 knots over that contracted for and was improved on by a run up and down the Long Reach measured mile, on which a speed of 13.32 knots an hour was obtained.

The Kermode burners are of the pressure atomizing type and are supplied with fuel oil by direct-acting steam pumps installed in duplicate. A complete system for heating and filtering the oil is also fitted, as well as a fan driven by a high-speed steam engine for the air supply. Each burner is mounted on a front plate and discharges into an air-cone which is built up of two tubes, one of which is cylindrical and is fixed to the boiler face and the other being coned and sliding inside the first. Both tubes are furnished with air ports, and by adjusting the position of the inner coned tube the effective area of the ports may be regulated. The arrangement works with an open stokehold, and the air from the forced draught fan is led to the burners by trunk ways. As each burner is enclosed in a separate air-control casing any of them may be put out of commission without affecting the draught control of any of the others.

The burner itself consists of two concentric cylinders with an annular space between them. The oil fuel enters the burner from the side and passes along this annular space and through grooves formed in the front end of the central cylinder which abuts against a cap nut. Through these grooves the oil obtains access to the discharge opening in the cap nut. The size of this opening is controlled by a central spindle which passes through the inner cylinder and is controlled by a hand wheel at the back end of the burner. These hand wheels can be seen in the figure. In addition to this, regulation of the outlet the burners may also be adjusted for different outputs by varying the pressure.

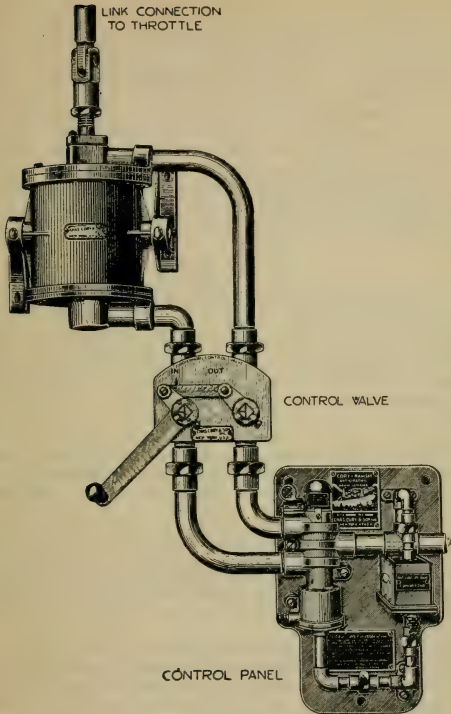
PROTECTION AGAINST RACING OF PROPELLER.—The governor consists of three units: a control panel, a control valve, and an operating cylinder. The control panel, as will be noted in the cut, comprises an anticipating-valve, a relay cylinder and a three-way piston valve. The panel may be mounted on one of the engine columns, bulkhead, or any convenient place, and connection made from pipe "A" to the condenser.

The anticipating-valve consists of a closed box suspended in the direction of the keel, in which there is a rocking valve controlled by a rolling ball. It comes automatically into operation when the lift of the ship's stern brings the propeller dangerously near the surface, causing the throttle valve to close the moment before the propeller leaves the water, and to re-open as the ship returns to her normal trim.

The valve is enclosed in an air-tight case and contains a hard glass tube in which the ball is free to roll. This tube is sealed to prevent any steam from coming in contact with the ball. A double rocking valve mounted on trunnions carries the tube, and adjustment of the valve for any trim is accomplished by setting the knurled thumb nut at the bottom of valve box.

The anticipating valve operates between the condenser and relay cylinder. When opened by the pitching of the vessel, the under side of the piston in the relay cylinder is put into communication with the condenser. Atmospheric pressure, always present on the upper side of the piston through holes in the casting, causes it then to force the piston down against a coiled spring. The relay cylinder piston rod and three-way valve piston are built in one piece, thus synchronizing the movement of both valves.

The three-way valve controls the admission of atmospheric pressure to either side of the double acting piston of the operating cylinder, which is connected directly with the throttle valve or lever. The piston in the



Control Device To Prevent Racing of Propellor

three-way valve is so arranged that when the governor is in the normal position and the main throttle open, the pipe on the right is in communication with the condenser, and the pipe on the left is under atmospheric pressure. When the valve piston is moved down, the pipe on the right admits atmospheric pressure, and the other pipe is put into communication with the condenser, causing the piston in the operating cylinder to move and close the throttle valve. As the ship's stern settles again into the water, the ball rolls back to the after end of the anticipating-valve box and closes it, thereupon opening the main throttle.—*Descriptive Pamphlet.*

NAVY ENGINEERS PLAN 3,000-H. P. DIESEL ENGINE.—DEPARTMENT EXPERTS WORKING TO DEVELOP TYPE FOR SUBMARINE CRAFT.—Washington, April 21.—Development of the Diesel engine, conceded by experts to offer the greatest possibilities for progress in ship propulsion, has been taken up

by the Navy Department. Designs have just been completed by naval constructors of a Diesel of 3,000 horse-power, which is to receive its official try-out in one of the latest submarines. It is believed to be the largest of its kind in the world.

Consideration also has been given to possible use of the same type of engine in the battleships *Colorado* and *West Virginia*, now under construction. Naval engineers have suggested that the new Diesel could be connected directly to the main generators of battleships which are electrically propelled, for use in port, thus permitting the ships' boilers to be entirely "laid by" with resulting economy in fuel consumption.

It was said today some engineers foresaw the possibility of the internal combustion engine eventually replacing the turbine as the main power unit of larger naval craft just as it apparently is destined to replace other power-producing machinery in commercial vessels.—*Baltimore Sun*, 22 April, 1923.

AERONAUTICS

HELIUM LIQUIFIED.—Helium gas has been liquified by Professor John C. McClellan of the University of Toronto. This is of especial interest to Canada as she possesses the most important helium resources of the British Empire, and it opens the way to great possibilities in the Canadian industrial field. This result has been accomplished after two years of experiment, the first time since a professor of the University of Leyden partially achieved it with a small quantity of gas.—*New York Times*, 1 April, 1923.

BRITISH TORPEDO FLYING BOAT.—The Supermarine Aviation Works, Ltd., of Southampton, England, recently completed the construction of a new type of torpedo flying boat for the Royal Air Force, regarding which *L'Aéro-Sports* gives the following particulars.

The boat hull is built of plywood and has two steps. Twenty-six water tight compartments are provided to insure flotation in case of damage to the hull. The bilge pump is actuated by an auxiliary engine of 60 hp. which is mounted in the boat and which also actuates a water propeller for surface navigation. This engine also operates the dynamos for lighting the boat and starting the engines, and it actuates besides a small winch for hoisting the 125 lb. anchor.

The wings are of triplane form and they constitute a unit which can be removed from the hull by removing a certain number of bolts. The engine mountings are incorporated in the wing unit. The wings have wooden frames, and the upper and middle wings are fabric covered, while the lower wing, which is 10 ft. above the water line, is entirely covered with plywood.

The following specification is available:

Span, top and middle wings, 16.46 m.

Span, bottom wing, 14.02 m.

Overall length, 9.15 m.

Maximum height, 7.62 m.

Total wing area, 112 sq. m.

Engines, two 600 hp. Rolls-Royce "Condor."

Gross weight, 9525 kg.

The Supermarine torpedo flying boat can carry sufficient fuel for a 1,000 mile flight, or it can carry two 3,000-lb. automobile torpedoes for a flight of less distance. The protective armament comprises five machine guns, disposed as follows: one forward in a gun ring, three amidships on a platform situated on the boat aft of the wings, and one aft, near the biplane tail.

The Royal Air Force has for some time been experimenting with large ocean going flying boats, none of which is believed to have so far passed the experimental stage. Among these boats there may be recalled the *Felixtowe Fury* (five Rolls-Royce "Eagle" 375 hp. engines), the *Vickers Valentia* and the *Short Cromarty* (both fitted with two Rolls-Royce "Condor" 600 hp. engines), and the *Fairey Titania* (four "Condor" engines).—*Aviation*, 9 April, 1923.

ENDURANCE RUN OF WRIGHT E4 ENGINE.—The Navy Department announced April 8 that a Wright model E4 aeronautical engine has just completed a record-breaking test at the Naval Air Station, Anacostia Field. The test comprised a total of approximately 573 hours with throttle wide open, during which time no essential parts of the engine showed any evidence of failure.

This engine, built by the Wright Aeronautical Corp., of Paterson, N. J., and subjected to intensive study over a period of a year by engineers of the Navy Department, would have covered during the test at the usual cruising speed maintained by the Navy at sea, a distance of approximately 60,000 miles or twice and a half times around the world at the equator in a period of a little more than three weeks, according to Rear Admiral William A. Moffett, Chief of the Bureau of Aeronautics.

This test demonstrated the entire practicability of operating aircraft engines at wide open throttle without overhaul for a period at least eight times as long as has been accepted in the past for conventional aircraft engines, naval engineers said. This means a saving of at least ninety per cent in the operating cost of these engines as compared to those of similar design in use heretofore. The improvement is the result of intensive work for more than a year in the engineering section of the Bureau of Aeronautics.—*Aviation*, 16 April, 1923.

FLYING PRACTICE ABOARD THE "LANGLEY."—The flying deck of the *Langley* is of steel, with a single layer of wood on top. While cruising this deck has several masts, with a smokestack protruding above on one side. When planes are launched everything is stripped and the deck is clear from stem to stern, with the exception of a network of wire cables. These run fore and aft and athwart the deck. The fore and aft wires are supported to a height of more than a foot on rows of "fiddlebacks," which are raised by hand and knocked down by the flying machine when it lands.

The landing paraphernalia is very simple. A large hook held close to the fuselage of the plane is dropped by the pilot when ready to land. As the wheels of the plane touch the deck this hook engages one of the athwart wires, whereupon graduated weights below the deck take up the speed of the plane and bring it to a quick stop. Meanwhile, a series of smaller hooks engage the fore and aft wires and prevent the plane turning in the wind.

The flying deck of the *Langley* looks large to persons standing on it, but to pilots approaching for a landing at high speed it seem little wider than a strip of ribbon, and they always wonder whether they will be able to strike it. Every precaution is taken to provide the greatest degree of safety in order to give the pilots maximum protection in landing. The deck of the *Langley* is not large enough for more than one plane to land safely at a time, and this will not be attempted except in a real emergency.

The *Langley* stands high above the water, and from a distance, with a flying deck far above the hull, has the appearance of topheaviness. Tendency in this direction has been offset by placing in the hold many tons of ballast.

Naval fliers are looking forward with keen interest to the commissioning of the two new modern aircraft carriers now being converted from

the hulls of battle cruisers doomed by the Five-Power Naval Treaty. These vessels, which will have twice the speed of the *Langley*, will be closer to the water and have numerous refinements which were not possible in converting the vessel originally designed for service as a collier. The flying decks of the new carriers will be more than 800 feet in length and approximately 105 feet in width, making a much safer landing platform.

The *Langley* is a fairly steady ship, but necessarily rolls and pitches in a heavy sea much more than a vessel of the dimensions of the new carriers. The broader beam and heavier hull construction of the latter will give them a minimum of roll and pitch, increasing the safety factor in taking off from and landing on the flying deck when the seas are heavy.

The stowage hangar on the *Langley* is open and in heavy seas will ship considerable water. On the new carriers the larger number of planes will be housed in a closed hangar.

Planes are taken from the hangar of the *Langley* to and from the flying deck by an elevator large enough to lift or lower two machines at a time. About three minutes are required to pick up a plane in the hangar with a large crane, place it on the elevator, and lift it to the flying deck in readiness to take off.

During the early flights from the *Langley* several planes in landing were thrown forward violently on their noses, smashing their propellers but doing no major damage to the machines. This tendency, due to the sudden stoppage of a plane traveling at a speed of fifty to sixty miles an hour, has been corrected by placing a small wooden frame between the fuselage and the top of the landing wheels. When a plane tips forward on landing on the *Langley's* deck this frame touches the deck and the pull of the weights below causes it to immediately assume an upright position.

Only one minute is required for the crew to jump from the nets alongside the deck, release a plane in the landing wires and move it forward for another flight. Everything on the *Langley* deck moves with clocklike precision.

A moving-picture film is taken of every landing, so that faults and defects may be clearly shown to the pilots. Experience has taught the officers that things happen so quickly with planes landing at high speed that the human eye cannot follow them accurately. These films are shown on the screen in the wardroom at greatly reduced speed, with all the pilots present. With one machine recently developed it is possible to stop the film and hold it indefinitely on one spot, so that every detail of the landing can be studied at leisure and faults and defects corrected on succeeding flights.—*New York Times*, 16 April, 1923.

NAVIGATION AND RADIO

NEW SHIP COMPASS READY FOR TRIALS.—INSTRUMENT SIMILAR TO THAT DEVELOPED FOR USE IN AIRCRAFT.—Washington, April 19.—A development of the new "earth induction compass" similar to that designed for airships, but intended for vessels at sea has been practically completed by Dr. L. J. Briggs and Dr. Paul R. Heyl of the United States Bureau of Standards and is ready for a sea trial on some Navy vessel. It is larger than the one used in planes, actuated by an alternating current motor instead of wind cups, and is more heavily built; but the principle is the same.

Two direct currents are generated by revolving two pairs of brushes at a velocity of about 1,400 revolutions per minute in the magnetic field of the earth. The instrument is so adjusted that when set for a compass bearing the currents flowing from each pair of brushes are equal and produce no effect on a galvanometer. If the instrument turns even slightly, one current becomes stronger and the dial needle is deflected.

The advantage of the instrument for war vessels in that while the generator may be put in a fighting top, the greatest possible distance from any effect of the magnetism of the metal of the ship, the control dial may be on the navigating bridge. In contrast to the gyroscopic compass, now in use on many vessels of the navy, the new compass is inexpensive and within the reach even of the small merchant craft.—*Baltimore Evening Sun*, 18 April, 1923.

CONTOUR MAP OF OCEAN BED.—The Bathymetric Chart of the west coast of the United States, from San Francisco to Point Descanso, Mexico, Hydrographic Office Chart No. 5194, just published by the Hydrographic Office of the Navy Department, is the result of a survey using the Sonic depth finder conducted by the U. S. S. *Hull* and *Corry* at the request of the Carnegie Institution of Washington.

The observations obtained by the survey of the U. S. S. *Hull* and *Corry* have permitted the construction of a contour map of the ocean floor by the Hydrographic Office from the coast line to a depth of 2,000 fathoms. This is the first successful contour map of a zone of deep sea soundings ever made. The chart represents the configuration of the ocean floor in the region, showing the submerged hills, valleys, cliffs and precipices. The recent earthquake in Chile suggests that the undersea portions of coastal faults may be most active and dangerous.

It is perfectly clear from the contour map that a number of very steep slopes or cliffs have been located, some of which may be fault scarfs of considerable elevation. The indications are that the chart also locates the so-called continental shelf which is commonly thought of as representing the structural demarcation between a sinking ocean bed and a rising continent.

Regions in which changes occur frequently, such as the coast of Chile or the Hawaiian Island group, can be studied with great care and detail, and the direction in which future displacement may be expected can be ascertained.

The clearness with which these contours are delineated by the Sonic survey completed suggests the possibility of a more effective study of continent building and of the general problem of isostasy than has heretofore been possible. Ancient connections, such as are supposed to have existed between South America and Africa or across the Indian Ocean, can now be worked out almost as positively as upon a land area.—*Army and Navy Journal*, 7 April, 1923.

U. S. S. "DENVER" TO MAKE IMPORTANT SOUNDINGS.—The U. S. S. *Denver*, attached to the Special Service Squadron in Central American waters, after completing her docking, overhaul, and the installation of a Sonic depth finder, sailed for its regular station in the Gulf, April 10, and en route will investigate for the Hydrographic Office of the Navy Department, by means of the Sonic depth finder, a reported 21-fathom bank reported E.N.E. of Cape Hatteras in approximate latitude 35 degrees 33 minutes North, longitude 74 degrees 10 minutes West.

There are many shoals and banks carried on the navigational charts published by Hydrographic offices, some of which are near the steamer routes. The position or existence of many of these shoals is not accurately known. There are also areas of considerable extent in the oceans which have never been explored.

The *Denver* during her stay in Southern waters will investigate for the U. S. Hydrographic Office, by means of a Sonic depth finder, some of these doubtful, dangerous and unexplored ocean areas which are to the eastward of Central America and north of South America.

Among the banks and shoals to be investigated are: Sacramento Shoal, Gulf of Campeche, lat. 20 degrees 50 minutes N., long. 93 degrees W.; Misteriosa Bank, lat. 18 degrees 50 minutes N., long. 83 degrees 50 minutes W.; and Serranilla Bank, lat. 15 degrees 50 minutes N., long. 79 degrees 30 minutes W. in the Caribbean Sea.

There are two unexplored sea areas to the northward of Colombia and Venezuela of approximately 57,000 and 45,000 square miles, respectively, and one to the eastward of Costa Rica of about 15,000 square miles, in which there are no records of any soundings of the charts. The *Denver* will run lines of soundings across these areas. This reconnaissance of these areas with the Sonic depth finder will develop some of the contours thus enabling the Hydrographic Office to form an opinion as to the need for more extensive surveys to locate possible shoals or banks in these unexplored sea areas.—*Army and Navy Journal*, 14 April, 1923.

ORDNANCE

U. S. S. "IOWA" SUNK BY GUNFIRE.—The experimental firing against the old battleship *Iowa* while under way under radio control in Panama Bay March 22, incident to the maneuvers of the U. S. Fleet, was a great success and demonstrated superior marksmanship. The old *Iowa* had a length of 360 feet, with armor on her water line eighteen inches, fifteen inches on turrets and a protective deck of three inches.

The battleship *Mississippi*, running at 19 knots, first opened the attack from a range of some six miles with her five-inch guns. One hundred and sixty-two rounds were fired with thin-walled shells, and twenty hits, it is unofficially reported, were made, mostly on the hull. The forward funnel was shot away, her radio control apparatus was destroyed and she was sufficiently hulled to take in large quantities of water, which soon caused her to list.

The second phase of the firing took place at about nine miles with the 14-inch guns, using armor-piercing projectiles with full charges. Nine salvos were fired from five of the guns and six hits were scored, two of them being near the water line, and making large holes in the hull. The *Iowa* finally turned turtle and sank in sixteen minutes from the time the second attack began. She went down about fifty-five miles off Balboa in seventy-five fathoms of water. Besides the holes in her hull, most of her upper works were shot away, including the bridge and both funnels.—*Army and Navy Journal*, 31 March, 1923.

LIQUID OXYGEN USED AS HIGH EXPLOSIVE.—The latest thing in blasting explosives, cartridges of lampblack soaked in liquid oxygen, got a trial at a quarry near here recently. The tests were conducted by a representative of a German firm of manufacturers of liquid oxygen apparatus under an arrangement with the United States Bureau of Mines. The test was said to have been successful.

The liquid oxygen explosive has a number of advantages over the older sorts. It can be made on the spot and the cartridge is perfectly safe until after the liquid oxygen has been poured into the hole into which it has been placed. The hole is then tamped and the cartridge exploded. No poisonous gases are set free by the explosion. If the cartridge fails to explode it is not a continuing source of danger, but after about twenty minutes the oxygen evaporates from it and it again becomes harmless.

The Germans are said to have made much use of liquid oxygen for blasting purposes during the war. It was unsuitable for a military explosive and was used, therefore, wherever possible in place of the expensive nitrogen-containing explosives, which were essential at the front.—*Baltimore Evening Sun*, 26 March, 1923.

NEW ARMY GAS MASK LETS WEARER SPEAK.—The Chemical Warfare Service of the army has developed a new gas mask so constructed as to enable the wearer to carry on conversation while using it and thus making it possible for officers to give orders in battle without removing it.

The new mask has a sort of diaphragm attachment somewhat similar in appearance to that used on phonographs. By means of it the wearer of the mask can carry on conversation with about eighty per cent of the efficiency of the average speaking voice.

The new mask has a sort of diaphragm attachment somewhat similar contains a new canister which, through the addition of new chemicals, not only protects the wearer against the ordinary gases used in chemical warfare but also against ammonia fumes and the deadly carbon monoxide.

There are also features embraced in the construction of the new, "all-purpose" canister that lessen air resistance and reduce the distress of breathing to practically a negligible quantity. This improvement includes elimination of the nose and mouth pieces and has resulted in considerable reduction in the amount of charcoal used in the mask. The new mask likewise contains a device for passing dry air from the chemicals over the eyeglasses of the mask. This prevents collection of moisture and considerably improves the vision. A special arrangement also enables the chemical containing case to be carried under the arm instead of on the chest, as in other types of masks, and thus provides greater freedom in body movement of the wearer.—*New York Times*, 15 April, 1923.

TWO BATTLESHIPS FOR ARMY AIR TARGETS?—By September 1 it is expected that arrangements will be made for turning over the battleships *New Jersey* and *Virginia* to the Army for use as targets for bombing tests by the Army Air Service.

It is understood that a comprehensive plan being prepared in the Air Service for conducting the bombing test with the condemned battleships will contain some entirely new features.—*Army and Navy Journal*, 14 April, 1923.

MISCELLANEOUS

AMERICA NOT TO BLAME IF ARMS TREATY FAILS.—London, March 8.—There seems to be a tendency in certain quarters in the United States to resent foreign criticism of the results of the Washington Conference as an aspersion upon the good faith and ability of American statesmen.

Why this should be so it is not at all clear, seeing that by far the most outspoken criticisms which have been published are those uttered by Americans themselves, especially naval officers. Many of the latter appear, indeed, to regard the fleet limitation pact in the light of a national disaster.

No responsible writer on this side of the Atlantic has ever questioned the benevolent motives which inspired President Harding to make his appeal for world disarmament. If considerations of domestic policy were present at all, they were obviously subordinate to the higher aim of stabilizing peace by removing one of the most fruitful causes of war—namely, competitive armaments.

Nor were the American proposals confined to the scrapping of fighting ships. They went to the root of the problem by seeking to eliminate political and economic friction in the Far East, which was rightly perceived to be the potential storm center. In pursuance of this aim the five-power treaty of naval limitation was supplemented by two covenants in which no less than nine powers were concerned, the one relating to principles and policies to be followed in questions concerning China and the other relating to the Chinese customs tariff.

In fact, American statesmen did everything that possibly could be done to buttress peace in a quarter of the globe where trouble seemed to be brewing, and their efforts were undoubtedly successful to the extent of a conflict which many sober judges had previously believed to be not only inevitable but imminent has in all likelihood been deferred for years to come.

As regards naval limitation, it is certainly not the fault of the United States that this object has been only partially achieved. The scheme which Mr. Hughes put before the conference at its first sitting embraced every type of fighting vessel, cruisers and submarines being rationed no less rigidly than battleships; and, according to my information, the American delegates in the ensuing discussions were solidly against exempting any type from the scheme of tonnage limitation. It was only when agreement on this point was seen to be unattainable, and further resistance threatened to jeopardize even the restriction of dreadnaughts, that Mr. Hughes and his colleagues gave way.

France has hitherto received all the blame for wrecking the original plan of disarmament by her insistence on a much larger ratio of submarine tonnage than was assigned to her. But it should not be forgotten that Admiral Baron Kato had previously expressed the unwillingness of Japan to accept any restriction on the number of so-called "defensive ships," a term which he clearly intended should apply to submarines, if not to cruisers as well.

It does not follow, therefore, that Japan would have agreed to the quota of auxiliary combatant tonnage allotted to her under the original plan, even if France had not come to the rescue so conveniently. But the point is that the United States, through her delegates, tried her utmost to secure the adoption of a comprehensive scheme which would have rendered future naval competition, in any shape or form, absolutely impossible. The fact that she did not succeed casts no reflection either on her sincerity or the skill of her statesmen.

Mangled and incomplete as the naval treaty in its form may have been, the majority of those present at the conference fondly hoped that it would still prove effectual as a curb on future rivalry in sea armaments. The only apprehension felt was lest France should begin forthwith to expand her submarine fleet. Apparently no one dreamed that Japan, who had co-operated so heartily in framing the pact, would be first to break away from the principle which it embodied, in spirit if not in letter. Such, however, was the case. Scarcely was her signature dry on the treaty when she began ordering so many cruisers and submarines that their tonnage exceeded the collective total of similar ships building or projected by all the other Powers.

Various explanations have been advanced by Japan for a procedure so difficult to reconcile with her attitude at the conference. It was necessary, we are told, to save the national shipbuilding industry from the ruin with which it was faced as the joint result of the mercantile shipping slump and the cancelling of battleship contracts, and the only means of doing this was to keep the yards going with minor naval orders. The reply to this argument is that foreign shipbuilding firms, which suffered quite as severely as those of Japan, have had to keep going without Government help, and have contrived to carry on by opening up new branches of manufacture.

In any case the placing of large orders for naval tonnage seems a curious method of meeting unemployment. If every other country adopted this remedy we should see naval competition revived with a vengeance. Great Britain, for example, with ten times as many shipyards as Japan and a million and a half men out of work, might with equal reason claim the right to build a veritable armada.

It looks as if the Japanese themselves realize the flimsiness of this pretext, for they now insist that the weakness of their battleship fleet, as cut down by the treaty, compels them to make good the deficiency by multiplying their lighter naval forces.

Quite apart from its disregard of the moral obligations imposed by the treaty, this excuse is even less convincing than the economic argument. So far from having forfeited any degree of naval power in consequence of the limitation agreement, Japan has gained enormous advantages in this respect, her strategic position today being at least twice as strong as it was before. Then, again, the new vessels which she claims to be building for the defense of her coasts are, in fact, the very types least suited for this function. Governments do not build fast cruisers of 10,000 tons and large submarines of ocean-going radius for purposes of coast defense. Consequently, with the best will in the world, it is difficult to square the facts of Japanese post-treaty naval policy with the official reasons given in justification thereof.

I understand that some comment has been provoked by an article of mine published recently in an American review, in which, dealing with Japan's hurried and secret fortification of the Bonin Islands for months previous to the conference, I said: "Whether the American naval experts were cognizant of the facts is a moot point, but it seems scarcely credible that they would have acquiesced in the status quo proposal for Pacific bases had they known that Japan was already in possession of a thoroughly equipped naval station at the Bonins. If they did know this, one is forced to conclude that their protests against the renunciation of the right to put the western islands in an adequate state of defense was overruled by the Washington Cabinet on political grounds."

To interpret these remarks as a slur on President Harding and his Cabinet is to misread them entirely. In the first place, it is by no means certain that the American naval authorities had received intelligence as to the elaborate nature of the forts that were being erected at the Bonins; in fact, the Japanese took extraordinary pains to conceal what they were doing there. Secondly, if this information had reached Washington before the conference met, there could be no more striking proof of the American Cabinet's resolve to promote disarmament than its decision to accept the situation.

Had it insisted on retaining the right to fortify the Philippines as a counterpoise to Japan's newly created stronghold in the Bonins, the whole plan for naval limitation would have collapsed at the outset, for Japan had made it clear that agreement on the status quo for Pacific bases must precede negotiations for the reduction of her dreadnaught program and that failing such agreement she would decline to accept any limit on her future battleship tonnage. Thus, if the "political grounds" mentioned in my article operated at all, they were of a higher nature than those of mere expediency.

Whether the sacrifice of defensive power which the status quo agreement imposed on the United States was well advised from the cold, matter-of-fact viewpoint of the strategist is a question to which no answer need be attempted here. But if doubts have lately arisen on the subject they are due entirely to the action of Japan in building so many additional war craft.

It was said at the time, and with truth, that the United States, by abandoning the proposed bases at Cavite and Guam, had given Japan an absolute guarantee of immunity from attack. Nowhere was the value of the gift more clearly appreciated than in Japan itself. And yet, immediately afterward, we find that country resuming the building of warships with an almost feverish energy, as if she were expecting an early attack, in-

stead of being, as she is, compassed by impregnable defenses, of which the broad Pacific is not the least.

In view of this unexpected development it is not surprising that doubts as to the lasting value of the Washington treaties should be invading the minds even of those to whom the conference has hitherto stood as the greatest peace achievement in history. Japan may be perfectly sincere in her belief that the new fleet she is building up is essential to her safety, in which case we can only conclude that she foresees dangers invisible to the rest of the world. On the other hand, this rapid expansion of naval force may be due to the influence of the militarists, who have never concealed their opinion that powerful armaments are required to discourage foreign interference with their plans for dominating the Orient. But whatever her true motive may be, Japan has already done much to vindicate the skeptics who declined to believe that the balance of power could be permanently maintained by international agreement.—Hector C. Bywater in *Baltimore Sun*, 25 March, 1923.

FRANCE AND THE WASHINGTON TREATY.—Paris, March 24.—It seems now to be assured that Premier Poincaré must put some sugar coating on the Washington naval treaty to get the Chamber to swallow it, for the Nationalists, who control Parliament, have regarded the compact as a bitter pill from the day Secretary Hughes proposed the ratio for French capital ships.

Unlike the American Senate, the French Parliament cannot tack reservations onto a treaty. It must take it or leave it as presented by the Premier. However, the Premier can suggest either reservations or changes which Parliament may adopt. In the present case it is planned to have M. Poincaré make certain declarations to be incorporated in the law authorizing the President of the republic to ratify the treaty. It is said that the French Deputies want reservations *a la Americaine*.

Frankly, the majority of the Deputies do not want the treaty, and if they ratify it it will be because the Premier backs its ratification as necessary for French foreign policy. Were the treaty before the Chamber strictly on its merits it would certainly be defeated.

The question now is: What are the reservations the Deputies will ask before they will ratify the treaty? The Chamber's Foreign Relations Committee, which relatively has more power than the American Senate Foreign Relations Committee, has asked M. Poincaré to add to the Treaty a Government reservation stating that France does not regard the 5-5-3-1.75 ratio as a permanent measure of her strength in capital ships, and a complementary reservation stating that France ratifies the treaty as valid only up to December 31, 1936. It will be recalled that the treaty provides for its remaining in force if within two years prior to the end of 1936 no nation has denounced it.

The argument back of the first proposal is that the ratio is unfair to France, who, although not now able to build up a big fleet of capital ships, might be able to do so some day. The second proposal is political in nature, and seeks to avoid placing upon the French Government in 1934 the possible task of denouncing the treaty, which at that time might still be regarded highly by the other parties to it.

On the other hand, the committee has dropped its proposal to raise the French ratio to 2.50, on the advice of M. Poincaré that such a step was impracticable, making necessary too extensive negotiations.

One hears it said repeatedly that America can have no valid objection to the French reservations since the Washington Senate has set the style, it being recalled specifically that the Senate even tied reservations to its ratification of the Pacific four-power pact.

On top of the reservations demanded by the Foreign Relations Committee, the semi-official *Temps* comes out tonight with a request for another modification of a more serious nature—in brief, that if Germany doesn't observe the naval disarmament clauses of the Versailles Treaty, France may not be bound by the naval treaty. This, of course, enters on a path which may lead almost anywhere, because England accepted her ratio only on the understanding that France's tonnage in capital ships would be set.

The *Temps* reasoning is ingenious, as Herbette always is. He begins by pointing to the American reservation to the four-power pact, to the effect that the United States is not bound to use force to carry out its obligations, and says that sets a precedent for France, which needs to make reservations on another treaty issue of the same conference. Recalling the difference between the prerogatives of the French Parliament and the American Senate, the *Temps* says the proper method for M. Poincaré will be to propose reservations to be inserted in the law permitting ratification. Herbette adds: "We hope the American Government will appreciate the effort made here to give definite character to the somewhat bitter Washington naval treaty."

The *Temps* then justifies the proposal to ratify the treaty specifically only until the end of 1936, saying that inasmuch as France doesn't intend to accept its provisions permanently, such a step will remove the danger of hard feeling later. Herbette then puts forth his proposal:

"When she signed the naval treaty at Washington France had previously signed the Treaty of Versailles. At Versailles Germany's naval armaments were limited, and she was forbidden to build warships for other nations or send naval missions abroad, and so on. As long as these clauses are obeyed France remains in the position she was in when the Washington treaty was signed. But if the Treaty of Versailles is violated all would be changed. New naval precautions would be necessary, and perhaps so urgent that there wouldn't be time to convoke the conference provided for in Article 21. Shouldn't this eventually be covered?"

The *Temps* then proposes a law ratifying the treaty, saying it is approved "with the understanding that ratification and execution of the treaty cannot have the effect of delaying urgent measures which the French Government may be obliged to take if certain provisions of the Treaty of Versailles appear to be no longer respected." The proposed law would set forth the provisions of the Versailles treaty referred to.

The *Temps* concludes: "After these reflections upon the naval treaty of Washington there remains another international pact signed at Washington, the treaty on the relative use of submarines. We shall speak of that later."

The *Journal des Debats* says tonight that France must ratify the Washington treaty, even though she does not like it. "Regrettable as was the manner in which the Washington negotiations were conducted, and contestable as may be the provisions adopted, the Government of France and the French Parliament cannot afford not to approve the treaty. Otherwise they would provoke in other countries signing the treaty, notably the United States, a very marked irritation which might gravely compromise our international position. More than ever there would be cries of 'French imperialism.' Harding and Hughes would never forgive us for imperiling the great accomplishment upon which they place so many hopes of various kinds."

The *Journal des Debats* approves the proposed declaration that France does not accept the ratio as permanent, and says this declaration must be made to other signatories. America, it argues, did the same thing with respect to the Four-Power Treaty. The newspaper adds that France will accept the ratio until 1936, but reserves her liberty after that date.

Pertinax, in the *Echo de Paris*, reviews what he regards as an injustice the treaty does France, saying: "Without consulting us, the representatives of England, America, and Japan, sitting behind closed doors, decided we could not have any more capital ships than a ratio of 1.75."

Pertinax approves the Foreign Relations Committee reservation, and adds that France must also make reservations on the compact limiting the use of submarines.

The *Matin* says: "One hundred and seventy-five German submarines held in check the greatest naval coalition in history. How much would 175 submarines cost us? The same price as six battleships."—Edwin L. James in *New York Times*, 25 March, 1923.

"MODERNIZATION" OF U. S. BATTLESHIPS.—Washington, April 15.—Work of elevating the guns of the battleships will start, as originally scheduled, on the return of the fleet from the Southern drill grounds next week if President Harding takes the advice of the naval authorities.

The unanimous opinion of the department as voiced by responsible officers of all ranks, after an exhaustive investigation by responsible heads of the issue raised by the publication of Secretary Hughes' "apology" for the misstatement regarding the British changes holds that nothing that has happened changes the status of the navy's recommendations.

With practically no dissenting opinion the department takes the ground that nothing in the spirit or letter of the treaty forbids elevating the guns, and that it is imperative that this be done if the treaty status of equality between the United States and Great Britain is to be established.

While refusing to comment on what is to happen pending final decision by the President, Assistant Secretary Roosevelt, who has been handling affairs in Secretary Denby's absence, is on record in the recent Congressional hearings as being unqualifiedly for the change in elevation. He believes the situation now is unchanged except that the disparity in range is less than was believed when the hearings were held. Instead of being out-ranged nearly five miles, as Congress was then advised, the difference, according to the figures based on the recent British statement, is about two miles for the main fleet.

Following a preliminary conference last week with the President, at which the details of the controversy were laid before him, Mr. Roosevelt had had all of the data bearing on it prepared ready for the Chief Executive in the near future when he is ready to take the question up for final settlement.

In order to summarize as clearly as possible the navy's attitude so as to give the public a better understanding of the entire matter, the following interview was obtained from Rear-Admiral W. L. Rodgers, head of the general board of the navy:

"American naval officers who were most closely in touch with the work of the Washington Conference of 1921-22 are at one in their belief that nothing in the naval treaty, either in spirit or letter, prevents increasing the elevation of the guns of United States battleships now in existence as provided by the Congressional appropriation of last session.

"The United States Navy is to be second to none. It can only hold this place under the treaty by modernizing its ships. Other nations are doing the same thing, but not all take the same steps to reach the objective.

"Modernization of ships is as old as navies. The United States Navy, like the British Navy and the French Navy, has always followed the practice.

"The limitations on modernization prescribed by treaty are to prevent abuse of the treaty by building practically new ships under cover of alterations.

"Such sharp practice it was the intention of the treaty to forbid, but each nation is free to modernize its own ships as it thinks best without disputing the methods preferred by any other navy, always keeping inside the treaty limitations. Great Britain has denied she has employed the method of modernization by increasing the angle of elevation of guns as the American Navy Department previously had reason to believe.

"This British denial the American Navy, through its Assistant Secretary, has accepted as conclusive, but such acceptance by no means affects United States rights to do as it pleases with its own guns without reference to Great Britain to learn in what form the latter is exercising her corresponding right. The change in angle of elevation is what the United States Navy needs to keep our ships equal to those of Great Britain, which may choose at pleasure means of modernization more suited to its needs.

Neither the treaty nor the spirit of the treaty attempts to preclude competition. A navy equal to Great Britain entails competition as its basis. The treaty limits competition to such as may take place within the terms of the treaty, and to this extent only.

"If the country wants no navy, or wants a navy that is inadequate and ineffective in support of national foreign policies, it may readily have such. But it should go about it knowing what it is getting and not thinking it is getting a navy second to none.

"Putting the matter in another form, it is unbelievable that our delegates in signing meant to agree that Great Britain by treaty was to preserve for some of her ships an ability, to fire at ranges which most of our ships cannot attain without alterations very moderate in extent. Our delegates surely meant to have a navy 'second to none.'

Supporting this opinion of Admiral Rodgers, who incidentally is the senior admiral of the navy on the active list, the following is an abstract of a "connected review of the whole matter" that has been prepared by one of the ranking officers in the department:

"There have been many references in the press to the question of increasing the gun elevation of turret guns of United States battleships. There seems still to be wanting, however, a connected review of the whole matter. Much will hinge upon a correct decision.

"When the treaty for limitation of armament was drawn its stated object was 'to contribute to the maintenance of the general peace and to reduce the burdens of competition in armament.' The specific measures to accomplish these objects centered around the adoption of the 5-5-3 ratio of naval strengths. When this ratio was applied to capital ships the ships and their present listed tonnages were given specifically. It was evident that if there was no restrictions placed on rebuilding or remodeling capital ships a few years might find ships of the same name still in service, but of greatly altered characteristics. Those things that could not be changed were enumerated in Part 3, Section 1 (d) of the treaty as follows:

"(d) No retained capital ships or aircraft carriers shall be reconstructed except for the purpose of providing means of defense against air and submarine attack, and subject to the following rules: The contracting powers may, for that purpose, equip existing tonnage with bulge or blister or anti-air attack deck protection, providing the increase of displacement thus effected does not exceed 3,000 tons (3,048 metric tons) displacement for each ship.

"The effect of this enumeration of forbidden changes is, as is well known to all, to permit all other changes that do not in effect amount to the reconstruction of the vessel. We have, therefore, to examine the meaning of the phrase 'no alterations . . . in general type of mounting of main armament.' This is the English version of the treaty. What does 'general type of mounting mean? We can get a great deal of assistance in determining

the meaning by going to the French version of the treaty, which has equal effect with the English version. The French version literally translated reads 'all change will be forbidden in . . . the number of guns of the principal armament as well as all changes in its general plan of installation.' . . .

"Reading these provisions of the treaty together, it will be seen that there is no prohibition against any change of the guns except (1) number and (2) general plan of installation.

"We have now to examine what the nature of the change is that will have to be made in our battleships if they are to be made equal to British battleships. The object to be attained is to make it possible for our guns to shoot farther. It must, therefore, be possible to point them higher in the air at a greater elevation. When the guns are pointed now as high as possible they touch the upper part of the turret opening through which they project. This opening is out through very heavy armor. If the guns must point still higher the turret armor will have to be cut away from the upper side of the gun port. That is step number one.

"As the muzzle of the gun goes up the breech will be descended lower in the turret and may come against the structure inside of the turret. Therefore, the second step will be to provide a clear space into which the breech of the gun may be depressed for the greater elevation of the muzzle. The third step in the change may require that the gun be pivoted on trunnions that are a little closer to the front armor plate of the turret. If this is done the breech of the gun will be a little more out of balance and will require more power to raise and lower it so that the change may involve a more powerful electric motor for elevating and depressing the gun.

"The above are all the primary changes involved in the proposed alterations to the turrets of our battleships. It will be seen that they do not change the number of guns, the caliber of the guns, their general arrangement or their 'general type of mounting' or the 'general plan of their installation,' but simply alter existing mounts and existing turret armor so that the guns may point higher in the air.

"In order that the full meaning may be clearly understood by the public it is well to remember that the British squadron at Coronel was sunk by the fire of the guns that outranged them; that the German squadron at Falkland Islands was sunk by the fire of the guns that outranged their guns, and that the forts of Liège and Namur, in Belgium, were destroyed by guns that could fire on them while their guns, being of shorter range, could not return their fire effectively. In other words, the proposal to prevent the American Navy from increasing the elevation of its turret guns is a proposal to place our capital ship fleet in a position that exactly parallels the position of the defeated squadrons at Coronel and Falkland Islands.

"Specifically there would be in the case of action by the two fleets, which happily seems improbable, a space of over two miles in extent which the British fleet would be able to fire on our fleet with an overwhelming superiority of guns in action. In addition the superior speed of the British fleet would probably enable it to prevent the American fleet from closing to a range where the odds would be less unfavorable to us. It seems as if the spirit of the treaty, being one of equality as between Great Britain and the United States, was of itself sufficient answer to the whole question. Fortunately, however, the specific terms of the treaty leave no doubt as to the correct interpretation of it."—*Baltimore Sun*, 16 April, 1923.

"MODERNIZATION" OF FRENCH BATTLESHIPS.—Paris, April 6.—Preliminary tests made with the modernized French battleships indicate, it is officially stated, that the eight alterations have improved the firing distance of their sixteen-inch guns from thirty to forty per cent.

While French naval circles exercise the utmost secrecy as to the exact improvement in the range of the guns, there is a suggestion that the French battleships now outdistance those of the other navies of the world, unless the same process has been carried out by other nations in the matter of sight elevation.

The French expect to establish the new ranges definitely during the firing tests to be held in the Mediterranean in connection with the general naval maneuvers which begin next Wednesday.

Those observing the tests thus far say the problem involved is about the same as in the case of the big German surprise guns that fired on Paris in 1917; it is possible to increase the range of guns, but always at the expense of accuracy and the size of the projectile used.

The sixteen-inch naval gun is something new in French armaments. It does not appear in naval reference books nor has it been mentioned in previous news dispatches. The largest guns credited to the French in the naval lists are the thirteen-inch caliber. Indeed, it was precisely because France was behind other signatories in gun-power that she was authorized by the Washington Treaty to "increase the caliber of the guns of her battleships, provided the caliber does not exceed sixteen inches."

The French Government, however, recently announced that it did not intend to increase the caliber of its guns, but would raise their angle of elevation, thereby increasing their range. While this elevation is not specifically allowed by the Washington Treaty, France had indicated that she considered it amounted to the same thing as increasing the caliber.—*Philadelphia Public Ledger*, 7 April, 1923.

"MODERNIZATION" OF JAPANESE BATTLESHIPS.—Tokio, April 1.—(By Wireless.)—Vice Admiral Ide, Naval Vice Minister, stated today the Naval General staff is now studying the question of gun ranges raised by the United States "modernization" plans for lifting the elevation of the principal guns. Admiral Ide said he could not indicate the result of the general staff deliberation since no official report had been received from Washington, nor any official hint of a desire on the part of the United States to discuss the question.

However, he did say, the matter does not concern Japan directly since Japan's "modernization" plans do not contemplate changes in gun ranges. All changes will be in the direction of increased protection against aerial and submarine attacks, including heavier deckplates and blistered bulges.

The admiral further declared that the Japanese Navy had not changed the gun ranges of the ten capital ships retained under the Washington arms treaty since they were commissioned, but continued that gun ranges were a matter of the highest secrecy in all navies and were unlikely to become the subject of free discussion.

From another well-informed source it is learned that Japan, prior to the present controversy, had not questioned its right to increase naval gun elevations. I understood from good source that Japan has been engaged in the work on its principal ships for the last three or four years and that such work actually progressed on one or two big warships during the Washington Conference. However, the work is still uncompleted for all ten of the retained capital ships.

At the time of the conference, Japanese naval authorities took it for granted that such changes were permissible.

It is pointed out here that increasing gun elevation is not the only way of increasing the range, hence it would be foolish to insist that this method only be ruled out.

Japan's "modernization" program calls for the expenditure of 50,000,000 yen (\$25,000,000) over a period of eight years, beginning with a 2,500,000 yen expenditure in the present year and increasing to 9,000,000 in 1930.

The Tokio press takes up the gun-range issue, interpreting it as a sign of American impatience with the limitations imposed by the Naval Treaty. The *Nichi Nichi* accuses the United States of "raising issues prejudicial to the effects of the Naval Treaty," declaring the contemplated American changes to be a violation of the spirit of the Washington agreement. The *Hochi* says the controversy leads to grave doubts as to whether Great Britain and America desire to maintain the terms of the treaty.—*Philadelphia Public Ledger*, 2 April, 1923.

CABINET TO REVIEW NAVAL SITUATION.—Washington, April 19.—The forthcoming Cabinet conference to decide whether the main batteries of thirteen American battleships shall be elevated to obtain an increased battle range may develop into a major naval council to discuss basic national policies of extreme importance.

Carefully compiled data, illustrating an international race for supremacy in naval auxiliaries which has followed the Washington arms conference, it was said today in naval circles, will be laid before President Harding with formal expression from his naval advisers as to the necessity of the American program if the agreed balance is to be maintained. With this data will be a summary of the joint report of the army and navy on the results of the recent fleet maneuvers off Panama.

The controversy over the gun elevation, raised by the denial of the British Embassy that similar action had been taken in the British Navy and the inference that it was considered as a violation of the five-power naval treaty, is expected to be subordinated to a wider program entailing a review of the full naval situation which has ensued under, if not from, the Washington convention.

On a mathematical application of the five-five-three ratio, President Harding will be informed that the United States is deficient 220,000 cruiser tons and upward of 80,000 submarine tons of the strength of her cosignatories and that these discrepancies are growing steadily.

In modern cruisers, according to the naval computation, the United States holds the small end of a one-four-two ratio, as compared with Great Britain and Japan, even should the ten cruisers of the *Omaha* class be considered as completed and in service. The 7,500 ton *Omahas* are rated as superior to the British ship of the same class, but the ten American vessels are faced by a British fleet of forty-seven and by a prospective Japanese fleet of twenty-one, the bulk of which are of 10,000 tons with armor and armament which make them to all purposes ships of the line.

The remainder of the Japanese program, embracing fifteen cruisers, twenty-four extra-sized destroyers and twenty-two sea-going submarines will be analyzed carefully in the navy's report to the President. Although every element of the foreign naval program is seen, as in the direction of increased size and efficiency, with resulting distortion of the agreed naval ratio, American naval experts do not charge that they in any way violate the letter or spirit of the treaty. It is axiomatic, President Harding will be told, that future naval supremacy will be determined by superiority in classes unrestricted by international agreement.

Expert designers and constructors of the Navy Department have been called into conference by the General Board to consider auxiliary types which should be recommended to meet the situation if the limitation of navies remains confined to capital ships.

The immediate problem set before these artisans was the design of a new submarine of around 2,000 tons. The *S* class forming the bulk of the underseas strength of the American Navy has never been satisfactory either for mechanical efficiency or for space within the hull.—*Baltimore Sun*, 20 April, 1923.

AIRSHIPS OF LIMITED USE IN TIME OF WAR.—London, March 29.—In *The Sun* of March 7 there appeared an interesting dispatch, quoting from the statement broadcast by Rear Admiral W. A. Moffett, chief of the United States Navy's Bureau of Aeronautics with reference to the voyages to be undertaken by the big dirigible *ZR-1*, now building at Lakehurst, N. J. According to this message, it is the intention of the naval authorities to send the airship on a flight round the world, and subsequently to the North and South Poles.

If this program be seriously contemplated, the designers of *ZR-1* must have unbounded faith in their work, for certainly there is no other airship in existence which would be capable of making such formidable journeys. If the *ZR-1* succeeds in cruising round the world without mishap it will give a tremendous boost to airship development in general, but an eminent designer here with whom I discussed the proposition was inclined to be skeptical.

"Either the Americans," he said, "have evolved a type of lighter-than-air craft which is far in advance of any produced in Europe, or they overestimate its powers, for a voyage round the globe would necessitate a degree of reliability and weather endurance considerably above the highest standard so far reached, even in Germany. As for the projected flight to the Antarctic, that would mean facing weather conditions which explorers declare to be the very worst in the world, and which in my opinion no airship yet built could live through. I therefore think the American enthusiasts are looking too far ahead, but it is all to the good that they should be paying so much attention to the development of this type, which is clearly indicated as one of the best and swiftest means of overseas transport."

In my own case I have personal reasons for being interested in airship development, for I witnessed the first successful long-distance Zeppelin flights in Germany fifteen years ago, and at a later date frequently watched the original army and navy Zeppelins maneuvering over the big Johannsfield aerodrome near Berlin. Moreover, during the war I saw Zeppelins in action on several occasions, and the first bomb dropped by a Zeppelin over the city of London, in September, 1915, detonated less than 200 yards from the office where I was sitting. Quite recently, also, I have read the German official account of their Zeppelin fleet and its war achievements.

It is evident from Admiral Moffett's statement that the *ZR-1* is built on the Zeppelin model, since he refers to her as being similar in type to the airship now constructing in Germany for the United States Government. And here let me say that no sounder model could have been chosen, for the Germans unquestionably lead the world in airship design, no other nation having had a fraction of their experience in this work. So America has gone to the right quarter for the nucleus of her airship fleet.

But when Admiral Moffett proceeds to expatiate on the unique value of the Zeppelin for war purposes he enters debatable territory, and since the vessels are apparently to be built in large numbers for the United States Navy, it may not be amiss to discuss briefly their shortcomings from the military viewpoint.

It is quite true that "for long-distance sustained flights, when carrying large loads, the rigid airship is in a class by itself." It is equally true, in theory, that the Zeppelin can "hover over a given spot, making for great accuracy in the dropping of bombs and in directing gunfire"; but to argue from this that "it has established itself as an effective weapon for warfare far removed from the coast and from available bases" is something of a *non sequitur*.

However, before dealing with this point, let me quote Admiral Moffett's final claim: "Filled with helium, a non-inflammable gas found in large

quantities only in the United States, we have (in the airship) a tremendous factor in naval warfare and an agency of vital importance to national defense." All these claims, excepting that as to helium, were put forward with equal confidence by Germany before the war, and so highly was the military value of the Zeppelin rated that no less than sixty-five of them—not counting thirteen dirigibles of other types—were built for the German Navy alone between 1914-18. In addition, twenty to thirty more were built for the use of the army; so that, from beginning to end, the Zeppelin war fleet numbered not far short of 100 units.

What influence did this huge fleet of sky cruisers exert on the operations by sea and land? The answer is—Virtually none at all. As showing their value for army purposes, it may be mentioned that after the second month of the war they were forbidden to come anywhere near the fighting zone, and thereafter were only employed on raids against England. As for the naval airships, some of them remained in service to the end, by which time the most ardent Zeppelin enthusiasts were disillusioned.

Here is the official record of their naval Zeppelin losses alone and the cause thereof: By enemy action, twenty-six; bad weather, fourteen; accidental explosion, twelve; total losses, fifty-two ships. Besides these, it was found necessary to place fifteen vessels out of commission because they were defective or unsafe. By the time the armistice was declared the German Navy had only seven effective airships left. All the rest had been destroyed by enemy action or misadventure, or become too defective for further use.

This appalling wastage might have been justified had the airships rendered any war service of conspicuous value; but they did not. Weather conditions prevented their being present on the critical day of Jutland, just when they were most urgently needed by the German fleet; and for the same reason they took no part in the Dogger Bank action of January, 1915, when a single efficient air scout would have saved the German battle cruiser squadron from running into the lion's jaws.

Although Zeppelins were supposed to be continually patrolling the North Sea, they were rarely or never able to detect the British warships that entered the Heligoland Bight, time after time, to sow mines or attack the German patrols. Zeppelin scouts gave no warning of the smashing air raid against the Tondern aerodrome carried out by machines from the big airplane carrier *Furious*—a blow that cost the Germans two of their latest dirigibles, which were blown to pieces in their sheds. In fact, the Germans admit themselves that their Zeppelins failed them on every occasion when they were most needed. In the latter part of the war they were withdrawn altogether from the North Sea, owing to the regularity with which they were shot down by the British airplanes or warships.

Should Germany ever go to war again, it is certain that she will first put all her Zeppelins in dry storage and keep them out of harm's way until peace returns. She still believes in their commercial utility as passenger and mail carriers, but as engines of war they are hopelessly discredited.

What is the reason why these giant airships, which look so imposing when sailing amidst the clouds, have become practically worthless for any operation of war? Simply this—that the airplane has already reached a stage of development at which it can be relied upon to destroy the largest Zeppelin under almost any circumstances. The airplane, being at least twice as fast, can easily overhaul the dirigible and select the most favorable position for attacking it.

Contrary to what is often claimed, the Zeppelin has no advantage in "ceiling"—that is, it cannot ascend to a greater height than the latest types of plane. It follows, therefore, that once a Zeppelin has been sighted by airplanes it can be speedily overtaken, outclimbed and attacked. Nor will a

filling of helium save it from destruction. This gas, it is true, being non-flammable, cannot be ignited by the flame bullets which brought down so many Zeppelins during the war. But once let an airplane get above the Zeppelin and drop explosive bombs on its back and the monster is doomed.

More deadly even than the bomb is the non-recoil shell with which the large fighting planes of the future will be armed. Weapons of this kind, firing projectiles of twelve or fifteen pounds, have already been mounted in airplanes and excellent practice made with them. Flying parallel with or above or astern of the Zeppelin, which offers an enormous target difficult to miss, hostile airplanes can send salvos of high-explosive shell smashing through its light framework and ballonets and shoot it to pieces in no time. That is why the Zeppelin is likely to prove an absolute death-trap to those who are foolhardy enough to go cruising in it during war.

Its one possible use is in the rôle of naval scout in areas where no hostile airplanes are likely to be met with; but since a scout, to gain intelligence of any value, must needs come within view, and therefore within range, of the enemy whose movements are to be reported, the terrible vulnerability of the Zeppelin restricts its usefulness even in this limited sphere.

Finally there is the question of cost, not of the airship alone, but of the enormous sheds which it requires for docking purposes. Germany has spent twenty million dollars in building sheds and other accommodations at a single Zeppelin base, that of Nordholz, near Hamburg. Further, to maintain a fleet of Zeppelins it is necessary to create an elaborate ground organization, which besides costing a great deal of money diverts large numbers of personnel from other duties.

The more closely one studies the pros and cons of this question, the more strongly is one confirmed in the opinion that as an adjunct to navy or army the big airship is an expensive and utterly useless luxury.—Hector C. Bywater in *Baltimore Sun*, 13 April, 1923.

DIRIGIBLE DEFENDED BY ADMIRAL MOFFETT.—The advanced state of construction of the rigid airship ZR-1 at the Naval Air Station, Lakehurst, N. J., and the fact that this huge ship, the first of its kind to be constructed in this country, will be flown during the coming summer makes timely a discussion of the relative merits of this type of aircraft.

The first question that arises may be stated briefly as: "What part will airships play in the future strategy of the sea?" This is a pertinent query in view of the fact that the experience during the last war is altogether insufficient on which to base conclusive statements, and yet, on the other hand, such experiences give in a measure an indication of future possibilities in the airship.

The merits and limitations of airships suggest at once that their function will be strategical rather than tactical—*i. e.*, that they will be used mainly for long-distance scouting and reconnaissance and as little as possible for combat. Even in the North Sea, where the comparatively small area, the prevailing cloudiness and the poor visibility render the airship's qualities of high speed, combined with great endurance, unavailable to anything like their full possibility, the Germans found their airships of great value in watching the British naval movements. The co-operation and reconnaissance of airships were of vital importance to the high seas fleet and were able to keep it fully informed, and this service is recognized with deep gratitude by Admiral Sheer.

In the battle of Jutland, ten airships were out and, although handicapped by low visibility, they were able to furnish some valuable information in the latter phases of the battle. In the sorties of the German Fleet in August, 1916, the surface ships were preceded by eight Zeppelins which guided the fleet and developed its attack.

A high British naval authority has reckoned the services of one airship as equal to that of six scout cruisers and the failure of the British to provide an adequate program of development along this line was severely criticized when the activities of the German Zeppelin fleet became increasingly evident.

A few uses which Germany found for the Zeppelin in the last war aside from bombing raids may be cited as follows:

In the works of Admiral Viscount Jellicoe, "The German Zeppelins, as their numbers increased, were of great assistance to the enemy for scouting, each one being, in favorable weather, equal to at least two light cruisers for such a purpose." And later in his excellent volume *The Grand Fleet, 1914-16*, the much reduced fleet made precipitately for home as soon as it was warned by its Zeppelin scouts of the approach of the Grand Fleet.

Admiral Jellicoe further says: "We had already had considerable experience of the value of Zeppelins to the German High Seas Fleet as scouts. That experience had fully confirmed the views put forward in 1913 on this subject at a period when, as Second Sea Lord, I had the Naval Air Service under my supervision. These views were expressed on an occasion when the building of a fleet of Zeppelins was being urged on behalf of the navy. It was then pointed out with emphasis how great would be the value of such vessels for reconnaissance duty in connection with fleet movements."

On the other hand, the lessons that were learned of rigid airships during the last war cannot be used to any great extent for a basis of plans for the future. Nor do the conditions which exist in the last war approximate those that might be anticipated in the case of an emergency for this country. Consider the Pacific Ocean as debatable territory in the future. Over the vast expanses of this body of water no other type of aircraft or surface ship can be considered even comparable to the rigid airship for ascertaining the movements of an enemy. Knowledge of these movements is a most vital factor in securing control of the sea and a successful issue of the combat between the main battle fleets.

In long-distance scouting it is seldom necessary to push home the observation against strong resistance. One would not send a light scout cruiser into the center of an enemy fleet formation. The airship is essentially a scout. It is not designed as a combat craft, and its area of greatest usefulness is not fifty or sixty miles off the coast, but 1,000 or more miles at sea. It can travel at a rate of more than double the fastest surface ship; it can sustain itself in the air for three days or more if the necessity arises and it can carry tons of supplies, stores and ammunition. If the worst comes to the worst it could put up a fight that would furnish plenty of interest for any adversary that might be sent against it.

It has been on the score of vulnerability that the airship has been most frequently attacked by military critics, and this is recognized as the most serious handicap to the airship for military and naval use. The susceptibility to fire from incendiary bullets will be the greater part eliminated by the use of helium, and even during the last war when a well-placed incendiary bullet in the hydrogen-filled gas bag of an airship was supposed to write finis on its chapter of usefulness, there are interesting instances on record where airships have been skilfully and successfully fought against attacks by airplanes.

In the case of a Zeppelin attacked by eight naval planes over England during the war we have an interesting illustration of such cases. According to the dispatches current at the time "four bombs were dropped when 200 feet above the airship. A large column of smoke was seen to come out of one of her compartments. The Zeppelin then rose to a height of 11,000 feet and is believed to be severely damaged." And in the same despatch, "All of our machines were exposed to a heavy fire from the Zeppelin." This is

scarcely conclusive as to the effectiveness of airplanes against rigids. The Zeppelin was "believed to have been severely damaged," but there was no evidence that she was destroyed in spite of a concentrated attack by eight planes, and the planes themselves had a rather warm time of it. And in another case where a Zeppelin was attacked by airplanes, "bullet now followed fast on bullet. We counted twenty-five hits, twenty-five holes through which the gas escaped, and still destruction was not effected." No, the airship most certainly is not invulnerable against attack from the air. On the other hand, neither is she at a hopeless disadvantage any more than any other types of naval craft which have their inherent weaknesses and their recognized uses.

For short-distance reconnaissance and battle purposes the heavier-than-air craft are undoubtedly more efficient and cheaper than any possible type of airship, but the comparatively small range and endurance of the airplane require some sort of carrier for its use at sea. Surface ships are generally thought of in connection with airplane carriers, but the airship is also susceptible of development as a carrier of heavier-than-air craft, and in this manner she may provide herself with an altogether adequate defense against attack from enemy planes. Even before helium was seriously considered the British had planned on placing a fairly heavy armament of rapid-fire guns on several airships. And today this is counted as much a part of the defensive armament of the airship as are 16-inch guns a part of the armament of the battleships. Were we to dwell upon the vulnerability of the airship to the exclusion of the manifold other sides of the question, there is scarcely a doubt that development along this line would cease and in extension of this we might just as logically dwell on the terrible havoc wrought by the machine gun against infantry, the frightful toll taken by gas attack, or the potential destruction of a 16-inch gun. In the strategy of warfare the advantage has always fluctuated with the progress of science and invention, swinging first to one side and then to the other as developments have been brought forth as answers to the latest menace.

If we go back again to the experience gained in the last war we find that "of the Zeppelins destroyed or damaged by gunfire, the majority of the losses were on bombing raids prior to 1918, and in practically all cases the damage was done while flying at low altitudes—9,000 feet or under." And the bombing raid over land was not a logical use for the naval air scout. It was only so used because its normal field of usefulness was restricted by the nature of the operations. On the other hand, only three cases can be found of fatal enemy damage to a rigid while operating with the fleet.

Let us turn to the project of long-distance flights by rigids and taking extreme tests—voyages to the poles and around the world—examine into their feasibility and practicability. Shortly after the announcement that in connection with the development of rigid airships in this country such flights would be incidental to the test of the ships, a letter from the distinguished Arctic explorer Vilhjalmur Stefansson, was received and may be quoted in part as follows: "Some time ago I announced my permanent retirement from polar exploration, giving as one of my reasons that I considered transpolar air commerce so near that special exploring efforts are not required. The polar regions will be opened as a mere incident to the development of commerce. In view of your announcement, I have thought it possible you might be particularly interested in the subject of a recent book of mine, *The Northward Course of Empire*. One chapter in it is devoted to transpolar air commerce and there is a map at the end illustrating this."

As for the matter of a flight around the world, if the impression has been given that this could be undertaken as a non-stop flight this is an excellent opportunity to correct it. Those who are familiar with the

endurance of modern airships cannot have gained such an impression, and for the benefit of those who have not followed airship development so closely it may be said that such a project is at the present time impossible and has never been contemplated. But the matter of circumnavigating the earth by airship with appropriate stops for refueling is an altogether reasonable and feasible proposition. To support this statement we may draw upon the experience of the German Zeppelin *L-59* which in 1917 made a non-stop flight from Bulgaria across the Mediterranean and Egypt to Lake Victoria Nyanza, and was then recalled to Jamboli, Bulgaria, without having landed. This voyage covered 4,500 miles without benefit of meteorological service, and over unexplored and enemy region. It may be added that the ship returned to Jamboli with fuel for forty-eight hours cruising, which represents almost 3,000 miles additional cruising radius. This voyage, of course, eclipsed that of the English ship *R-34*, which made the round trip across the Atlantic Ocean shortly after the end of the war.

The matter of long-distance and endurance flights is inevitably linked with the strategical value of the airship as an instrument of war, and such tests would be of incalculable value. It may be added, however, that they would only be undertaken with the same degree of preparation and careful planning that insured success to the first transatlantic passage by air of the *NC-4* in 1919, which was carried out by the United States Navy.

If further justification be needed for the development of rigid airships in this country beyond that of national security it can be found in the commercial possibilities which may come to be recognized generally of late years, both in this country and abroad. One of the reasons for developing airships which has actuated the Navy Department in this project has been this commercial possibility, and the advantages that will accrue to American commerce and industry through their development.

The Navy has in many ways in the past been able to point the way to progress in peace as well as do its full duty in war. Many of the maritime developments which serve the interests of commerce today had their origin in naval construction and engineering, and in the development of airship construction and operation a further field of usefulness is opened up in which the navy may pioneer to the lasting benefit of the country.—Rear Admiral W. A. Moffett, in the *Baltimore Sun*, 16, 17 April, 1923.

CURRENT NOTES AND PROFESSIONAL PAPERS

"Electrons, Atoms, and the Ether."—(An outline of the present knowledge of the subject resulting from recent investigations.)—By W. B. Cartmel in *The Engineering Journal*, April, 1923.

"The Design and War Service of Coastal Motor Boats."—(Abstract of paper read before the Institution of Naval Architects.)—By Sir J. E. Thornycroft, in *The Engineer*, 30 March, 1923.

"New Type of Flying Machine—the Lacierva 'Autogiro.'"—(A brief description of the new Spanish machine which lands with practically no forward speed.)—By Heractio Alforo in *Aviation*, 9 April, 1923.

Pertinent articles in:

Engineering for 23 March, 1923:

- (1) "A Proposed Aircraft Carrying Mail Steamer."
- (2) "The Air Estimates."
- (3) "The Institution of Naval Architects."
- (4) Remarks on Some of the Present-Day Problems in the Design of Ships." (Illus.)
- (5) "First Report of the Steam-Nozzles Research Committee."

The Engineer for 6 April, 1923:

- (1) "The Development of Naval High-power Valves."
- (2) "Electric Ship Propulsion."
- (3) "Conversion of Warships to Mercantile Use."

Aviation for 2 April, 1923:

- (1) "The Wright All-Metal Pursuit Plane."
- (2) "Characteristics of U. S. Naval Airship Z R 3."
- (3) "Proposed Type of Rigid Airship for Civil and Military Purposes and Airship Depot Ship." (Illus.)
- (4) "Experiments in Contact Flying."

Army Ordnance for March-April, 1923:

- (1) "Tendencies in Ammunition Design," by J. K. Crain.
- (2) "Sympathetic Detonation," by C. G. Storm.
- (3) "Dyes and National Defense," by C. K. Weston.
- (4) Gun Recoil and Recoil Systems," by Lieutenant Commander A. G. Zimmerman, U. S. N.

The Coast Artillery Journal for April, 1923:

- (1) "Doctrine and Command," by Brigadier General R. P. Davis, U. S. A.
- (2) "Our Military Policy Regarding the Training of Citizens," by Major E. W. Thomson, C. A. R. C.

Current History for April, 1923:

- (1) "The Case for the Naval Treaty," by Rear Admiral W. V. Pratt, U. S. N.
- (2) "Germany's Ability to Pay," by J. Ellis Barker.
- (3) "President Harding's Plea for the World Court."
- (4) "Rival Foreign Policies in Great Britain."—Editorial.
- (5) "Monarchist Sentiment in Germany," by Sarah Wambaugh.

The Fortnightly Review for March, 1923:

- (1) "Some American Naval Views," by W. H. Gardner. (Vice-president, Navy League, N. S.)
- (2) "The New German Merchant Fleet and Others," by Archibald Hurd.

NOTES ON INTERNATIONAL AFFAIRS

FROM MARCH 23 TO APRIL 23

PREPARED BY

ALLAN WESTCOTT, Professor, U. S. Naval Academy

UNITED STATES

LANSING-ISHII AGREEMENT CANCELLED.—On April 15 notes were exchanged between the United States and Japanese governments formally confirming the cancellation of the Lansing-Ishii Agreement of 1917. This agreement recognized special interests of Japan in China, especially in Chinese territory contiguous to that of Japan. It was set aside, however, by the treaties negotiated at the Washington Conference, a result which the present exchange of notes merely confirms.

The Root-Takahira Agreement of 1908, still in effect, pledges both nations to maintain the *status quo* in the Pacific, equal rights for all nations in China, and Chinese independence and territorial integrity.

RHINE ARMY COSTS STILL UNSETTLED.—At the close of April the negotiations in Paris over settlement of the American Rhine Army claims were still unfinished. It was agreed that the \$240,000,000 due should be settled in twelve annual payments, but a final hitch arose over American insistence that these payments should be given priority over payments in funds or in kind to the European allies.

UNITED STATES AND WORLD COURT.—According to a press report of April 19 from Geneva, Miniechiro Adachi, Japanese Minsiter to Belgium, who is official reporter for the Permanent Court of International Justice, and Professor Manly C. Hudson of the Harvard Law School, were at work on the details of a plan by which the United States might become, a member of the court on the terms stipulated by Secretary Hughes.

In spite of widespread criticism, President Harding in speeches and interviews adhered to his advocacy of American participation in the court. Speaking at Des Moines on April 21, Secretary Hoover also defended his policy. He declared that the chief objection was the connection of the court with the League of Nations but pointed out that, although created by the League, the court really functioned under a treaty among the

powers that had submitted to the court's jurisdiction. He added that the President's proposal did not involve submission to compulsory jurisdiction.

The "statute" of the Court provides that it may handle disputes about treaties, breaches of international obligations and reparations for such breaches, provided such disputes are submitted to it by both parties. There is also an optional clause attached to the statute, which if accepted by a nation thereby pledges that nation to compulsory jurisdiction of the Court in certain legal disputes with other nations, who also have accepted the optional clause. Eighteen nations have adopted this optional clause—although Great Britain, France, Italy and Japan are not among them. (The President's proposal for our participation in the Court does not call for adherence to the optional clause). —*Time*, April 21.

LATIN AMERICA

ARMAMENT DISCUSSION AT SANTIAGO.—The limitation of armaments negotiations at the Pan-American Conference in Santiago seem to be on the point of breaking down, owing to the hostilities of Argentina. The Expounding Secretary, Antonio Huneus, Chili, brought forward the recommendations of the Armaments Committee which provide: that the question of the limitation of armaments of South America be solved through separate negotiations between the interested nations; that the Governments declare their desire for immutable peace and against armed peace; that they adhere to the Washington naval treaties, fixing the tonnage of capital ships and establishing immunity for neutral merchant ships from submarine attack; that they adhere to the various international conventions tending to prevent and humanize war.

Brazil accepted the recommendations in principle, but Argentina said that the report did not in all respects meet with her views, and intimated that she would have something more to say at a later date.—*Time*, April 21.

DEADLOCK IN THE RUHR

INDIRECT GERMAN PROPOSALS.—In a speech in the Reichstag on April 26, Foreign Minister von Rosenberg of the Cuno Cabinet made statements which were interpreted as indicating the terms which Germany was willing to offer for a settlement in the Ruhr. Baron von Rosenberg stated that last January Germany was prepared to offer twenty billion marks, plus such sum as might be judged reasonable by an international commission, and he thought this might serve as "a point of departure" for renewed discussions. He added that Germany was favorable at all times to the Hughes plan of settling the reparations question by a neutral commission, but that the system of passive resistance in the Ruhr would be continued indefinitely if necessary.

On the same date it was announced in Paris that exports of coke from the Ruhr to France and Belgium had reached 10,000 tons a day, plus 3,000 tons of coal, a figure which it was said would cover the expenses of the Ruhr occupation.

Speaking in the House of Commons on April 21 Lord Curzon indicated that Great Britain contemplated no immediate change from her policy of "hands off," but had suggested to Germany that she make renewed approaches to France.

At Dunkirk on April 15 Premier Poincaré definitely denied any intention of annexation on the part of France, but repeated the fixed intention of the French Government to hold the occupied territory until a settlement was made. He said in part:

"The guarantees which Germany did not wish to give us and which certain of our Allies in good faith thought useless we considered necessary. What we have seen in the Ruhr has convinced us we were right.

"We hold these guarantees now: we hold them solidly, and we shall not give them up for mere promises. We will quit the occupied regions only as we are paid what is due us. Be sure that in affirming her will and in proclaiming to the world that she intends to enforce the peace Treaty France has not lowered herself in the esteem of the peoples of the world. She is grander in the eyes of all those who respect right, and those friends of ours in England and America who differed with us on the advisability of our action have been obliged to approve our motives and the legitimacy of our claims.

"The change of opinion in our favor in the United States and throughout the British Empire is certainly due in great part to the fact that we knew enough to put our hand on what Mr. Bonar Law calls the jugular vein of Germany. We do not wish to strangle anyone. We have no other ambition than to be paid and protect ourselves from financial disaster.

"The accusations of imperialism which German propaganda has been able to provoke against France in quarters too easily accessible to it are only foolish and childish. No sensible person can believe that France, which has always furthered the rights of mankind and given the fullest expression to national sovereignty, has the foolish thought of submitting foreign populations to her authority and grabbing territories against the wish of their inhabitants."

LOUCHEUR'S VISIT TO ENGLAND.—During the first week of April former Minister Loucheur, a leader of the Moderate party in France, visited England to sound out the British attitude toward a renewed Franco-British understanding. His journey was entirely without official sanction from the Poincaré Government. M. Loucheur stated on his return that he found sentiment in England swinging strongly toward France, and that he intended to bring pressure on M. Poincaré to make immediate moves toward a concerted policy with England.

NEAR EAST

ALLIED REPLY TO TURKEY.—At the close of March, following a conference in London, France, Italy, and Great Britain agreed upon a reply to Turkey consenting to a renewal of negotiations at Lausanne on April 23. The reply rejected the Turkish request for separate consideration of the economic clauses of the treaty, and also the request for further modification of the judicial clauses affecting foreigners. It was agreed that the question of indemnities growing out of the Turco-Greek war might be adjudged by a neutral commission. Soviet Russia is not allowed representation at the conference.

TURKISH CONCESSIONS TO ADMIRAL CHESTER.—Early in April it was announced that the Angora Government had granted extensive railway and

mining concessions, not only in Turkish territory proper but extending into the British mandate of Iraq, to the Turkish-American Development Company represented by Admiral Colby M. Chester. The concessions included railways in eastern Asia Minor running from Sivas to Angora, Samsun, Erzerum, and Van, with oil and mining rights for twenty kilometers on either side of the railways, and also grants for construction of ports, roads, canals, telegraph lines, factories, etc. The railway concessions included a line from Harput to Sulemania within the Mosul region claimed by Great Britain. In view of their extraordinarily comprehensive character the Turkish grants were regarded abroad as primarily a political move to involve the United States more directly in the negotiations at Lausanne.

The French Government protested to Turkey that the Chester concessions constituted "an unfriendly act," in conflict with French concessions based on a loan to France in April of 1914 and in conflict also with the agreement negotiated in 1921 between France and the Kemalists.

To a French note on the subject the American State Department replied that, while the United States Government intended to support all legitimate American claims, time was required to examine more fully the status of the Chester concessions before action could be taken.

RED CROSS ENDS EMERGENCY RELIEF.—On April 2 the American State Department issued notice to the Allied Powers that American Red Cross Emergency Relief for adult refugees in the Near East would be ended on June 30. According to the note, the organization for five months had provided for approximately 868,000 refugees in Greece and islands of the eastern Mediterranean. The note requested that Great Britain, France, and Italy direct attention to the problem, and stated that if a constructive plan could be worked out for an apportionment of the task and its gradual solution, American relief agencies would be ready to co-operate even after termination of emergency relief on June 30.

GREAT BRITAIN AND IRELAND

LAW CABINET THREATENED.—On April 10 the Bonar Law Government in England suffered an unexpected defeat in the House of Commons over a minor question, the investigation of grievances of ex-service men. Later Mr. Bonar Law issued an official statement that the Cabinet had no intention of resigning. Discussion of the reverse centered chiefly on the weakness of the present Conservative Ministry, especially in view of the Premier's ill health and inability to speak in the House, and the possibility of a new government based on the center party idea, with ex-coalition ministers included and Mr. Austen Chamberlain at the head. This, it was held, would be the only alternative to ultimate control of the government by the Labor party.

BRITISH BUDGET STATEMENT.—The first budget of Chancellor of the Exchequer Stanley Baldwin was presented to the House of Commons on April 16. It stated that the Treasury had a surplus last year of about £100,000,000; that the estimated taxes and expenditures for the coming year promised a favorable balance of about £36,000,000; and that in view of these circumstances it would be possible to reduce slightly the income and profits taxes and cut the beer tax a penny a pint. The report stated that financial conditions were showing steady improvement.

REBEL IRISH LEADERS CAPTURED.—On April 10, Liam Lynch, Chief of Staff of the irregular Irish forces, was captured by Free State Troops and later died of wounds. Eammon de Valera and other rebel leaders narrowly escaped. It was calculated that there were about 10,000 irregulars in Free State jails and internment camps, and that resistance was practically broken.

RUSSIA

CHRISTIAN PRELATES PUT TO DEATH.—Archbishop Ziqliak, head of the Roman Catholic Church in Russia, and Vicar General Butchkavitsch, were condemned to death in Moscow on March 26 on charges of treacherous opposition to the Soviet Government. The Vicar General was put to death five days later by being shot in the back of the head.

The execution took place in spite of the protests of European powers, the United States, and the Pope. M. Tchitcherin replied to the protests in sharp notes referring to them as "unfriendly acts" and manifestations of an aggressive policy against Russia. He asserted the undeniable right of Russia to punish criminals according to her laws.

The trial of Patriarch Tikhon, head of the Greek Catholic Church, on similar charges, was set for April 10 but later postponed to April 24. According to a Soviet bulletin the Patriarch confessed to treasonable connection with the Kolchak and Wrangel counter-revolutionary movements.

REVIEW OF BOOKS

WITH THE RUSSIAN ARMY, 1914-1917, (2 Vols.), Major General Sir Alfred Knox, K. C. B., C. M. G. E. P. Dutton and Company, New York. 760 pp. \$15.

A REVIEW BY COLONEL W. K. NAYLOR, G. S. U. S. ARMY

A work in two volumes which was prepared chiefly from the diary of the author, filled in and made complete by a narrative, data for which was obtained by personal observations and deductions, and from that of others. The work is freely illustrated by photographs of individuals, of groups of individuals, and of scenes in the theater of war. In addition, there are nineteen maps accompanying the work, drawn with sufficient detail to enable the reader to keep himself oriented geographically.

In a study of the World War from the viewpoint of operations on the Eastern Front, the question always arises in the mind of the student as to what was the matter with the Russian Army and why was it that Russia with her wonderful resources both in men and material crumbled before the armies of the Central Powers and completely went to pieces, the government changing itself from that of autocracy, through various vicissitudes, to its present form, whatever may be the most appropriate name for it. General Knox in the early part of his work, points out in a very lucid manner wherein the shortcomings of the army lay and later on wherein the government so completely failed. Upon entering this war, Russia had expected that it would be short, for all of her previous wars of recent centuries have been rather short as compared with the World War, and she was prepared to meet the emergencies of a short war; but when the operations extended themselves into years instead of months, the Russian authorities found that they had not so marshalled the resources of their country that they could keep up the uninterrupted flow of supplies of munitions and food from rear to front so necessary to insure success. In her dilemma, Russia called upon her allies for assistance but when that assistance came, she found that she was unable to take full advantage of it due to the fact that her railroad system and system of dirt roads were so inferior as to break down and become swamped with the ever-increasing demands made upon them.

A study of the Russian situation makes it only too apparent that provision must be made in time of peace for industrial mobilization, and while it is equally, if not more, important to make provision for the mobilization of man-power, that man-power once mobilized becomes impotent unless it can be supplied with modern instruments of war. Russia also discovered

that she had made no provision for a reserve of officers to meet the drain upon that corps made by active service. The Russian soldier normally is a good fighter so long as he has officers to lead him. To quote from the text, "The Russian soldier requires leading more than any soldier in the world, and the lack of officers and non-commissioned officers of quality was felt throughout the war." This quotation should be kept in mind, particularly in this country, by those who may think that building up a reserve officers' corps is entirely unnecessary. While the American soldier has always had great individuality, it must be borne in mind continually that no matter how able and intelligent individuals may be, they quickly degenerate into an uncontrollable mob without leaders. The difficulties of Russia in regard to supply are quite vividly shown in the following paragraph taken from the author's introduction:

A very few weeks of war proved to all the combatants that their initial stocks of shell and materials of war generally were insufficient to insure a decision. Germany, France and England diverted their thousands of factories to war-work. But Russia, with her 180 million inhabitants, had roughly only one factory to Great Britain's 150. She had not the machinery or the tools or the trained personnel. Machinery and tools could only be obtained from America, where the Allies had already swamped the market. Even if shipped from America there remained the difficulty of their delivery at industrial centers in Russia.

The author, himself, could see that Russia was steadily tending toward revolution. On September 19, 1915, he reported: "If there has ever been a government that richly deserved a revolution, it is the present one in Russia. If it escapes, it will only be because the members of the Duma are too patriotic to agitate in this time of crisis." It is a generally accepted legend that Russia was sold out to Germany by members of her official military and governmental service. After reading the text, one is impressed with the fact that the downfall of the Russian Army was due to the defective supply systems and general corruptness and incompetence in the staff and higher up; not a leaning toward Germany but a corruption born of selfishness and a desire on the part of offenders to benefit by the transactions in which they were taking part.

The railroad system completely failed, due in a great part to the fact that the railroads were turned over to the military for control and operation instead of merely direction. A glance at the map shows the great advantage that Germany had over Russia with her Rocate lines paralleling her border and that of her ally. Germany and Austria could concentrate almost anywhere before Russia. The Central Powers had the additional advantage of a re-entrant frontier which made it possible for them to strike their enemy from two directions simultaneously.

There were many brilliant feats of strategy and tactics carried out by the Russian Army. As an illustration, the counter-offensive in October-December, 1914, which drove the Germans back from Warsaw is the most outstanding. Before this, however, we have Samsanov's defeat at Tannen-

burg which was brought about by a premature advance of the army of the Narev before mobilization and concentration had been completed.

There are many things brought out in the text that show the weakness of the Russian Army. For example, poor communications as already mentioned; no arrangements made for replacements except in certain select organizations; the shortage of ammunition supply; failure to conserve rifles; failure to entrench; failure of Russian cavalry to pursue after a success and its lack of understanding of the advantages and use of dismounted fire action; defective intelligence arrangements; often no systematic patrolling of the front; relying upon local purchases for supply rather than an efficient supply system, etc. Many of these defects were existent in the Japanese War but had not been corrected.

The text, from time to time, gives short biographies of leading Russian generals which bring out many strong characters, nevertheless I believe that the real hero of the war on all sides, Russia in particular, is disclosed by the following extract from the text: "I wonder when people will realize that the real hero of the war is the plain infantry private or second lieutenant."

The author gives a very clear description of the conditions preceding the revolution; a description of the revolution and the coming of Kerenski and later the Bolshevik Coup D'Etat. Both Kornilov and Kerenski ran true to form following historical precedent; that is, Kornilov was severe without the ability to enforce his will entirely, and Kerenski was weak when he should have been strong. The revolution started as a bloodless affair that might have been handled and kept within bounds had the right man or group of men appeared upon the scene. The discipline in the Russian Army was not nearly as severe as that in the armies of the allies, showing that the Russian soldier was easily amenable to reason and to argument. In one case the author refers to the mutiny of a regiment in Petrograd, and the officers were not enough concerned with it to forego their evening's bridge game. When discipline is gone in the army, so is everything. Even Kerenski realized this for he stated in a communication of May 25, 1917: "Without discipline there can be no safety."

The final offensive that came to such an inglorious end had at least one bright feature, and that was the heroic action of the officers in actual command of the troops. They did not hesitate to risk their lives when the occasion called for it, and many died in a most gallant manner vainly endeavoring to lead their troops forward. Their actions will stand out as a bright star of which all Slavs may justly be proud when, in after years, they contemplate the desert of darkness surrounding their motherland of this epoch. Taking General Knox's contribution to history by and large, I believe every student of the World War should read it, and I personally have found that after a careful review I have a fuller picture of conditions on the Eastern Front and in Russia and fully believe that had the Russian soldier been given any kind of a chance, the story would have been different.

JANE'S FIGHTING SHIPS, 1922. Edited by Oscar Parkes, O.B.E., M.B., Ch.B. Sampson Low, Marston and Company, Ltd. London. 426 pages.

A REVIEW BY COMMANDER H. G. S. WALLACE, U. S. NAVY

For many years, *Jane's Fighting Ships* has been the standard work of reference on the navies of the world, and has been of great value, not only to those who are interested in warships from an academic point of view, but to naval men the world over.

The 1922 *Jane* is well up to the standard of previous editions. Edited by Mr. Oscar Parkes, one of the joint editors of the preceding edition, it carries out, in the main, the same general plan as that heretofore employed, but with an even greater amount of detailed information, and with improvements in several features.

Among the improvements to be noted are the increased number of excellent photographs, many of them on quite a large scale, the addition of a number of aircraft views of ships, the increased size and clearness of the silhouettes, the greater amount of detailed information regarding the battleships to be retained under the Limitation of Armament Treaty, and a considerable amount of information regarding the new and projected aircraft carriers. The volume is somewhat smaller than preceding editions, due to the omission of harbor charts, and the elimination of individual photographs of some of the relatively unimportant auxiliary and supply vessels. There have also been omitted entirely those ships formerly projected, or in course of construction, but which, under the treaty, are not likely ever to be completed.

Altogether, the 1922 *Jane* reflects great credit on its publishers, and is an essential addition to every naval library.

SECRETARY'S NOTES

Obituary Notice

The Secretary regrets to announce the death, on 3 May, 1923, of Mr. James W. Conroy, for thirty-seven years connected with the Naval Institute. By his high sense of responsibility, devotion to duty, and painstaking efforts in behalf of the Institute, he has effectively assisted in its growth. By his unfailing courtesy and spirit of co-operation he has won the friendship of all who knew him, Personally known and highly regarded by thousands of members of the Institute, from admiral to ensign, his loss will be regretted by all.

Awards in Prize Contest Handling Personnel

The Prize Contest for the best "Outline Plan of a Textbook for Midshipmen on HANDLING PERSONNEL" met with a gratifying response. Twenty-one articles were submitted, and much valuable material was received.

Prizes have been awarded as follows:

First prize, \$200, Lieut. Comdr. P. V. H. Weems, U. S. N.

Second prize, \$150, Lieut. Comdr. Fitzhugh Green, U. S. N.

Third prize, \$100, Lieut. Comdrs. E. G. Small and M. S. Tisdale, U. S. N.

Fourth prize, \$75, Lieut. A. G. Shepard, U. S. N.

Fifth prize, \$50, Captain W. T. Cluverius, U. S. N.

Sixth prize, \$25, Comdr. C. B. Mayo, U. S. N.

Seventh prize, \$25, Colonel G. C. Thorps, U. S. M. C.

Change in Board of Control

Captain John Halligan, Jr., U. S. Navy, tendered his resignation as a member of the Board of Control, due to detachment from duty at the Academy. His resignation was accepted with regret by the Board.

Members who have not yet paid their dues for 1923 are urged to do so promptly. The amount of outstanding dues is in excess of \$10,000, which is a heavy drain upon the Institute's resources. The interest alone upon this sum is about \$500 per year.

Subscription Rates In order to bring the subscription rate more nearly in line with the cost of publication, the Board of Control has increased the subscription rate to \$5.00 per year. A special rate of \$3.50 per year is made to members only (not available to societies or organizations) in order that they may send subscriptions for the PROCEEDINGS to their relatives and friends. (Foreign postage 50 cents extra in all cases). Subscriptions are automatically discontinued at expiration.

Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication. In accepting articles for publication, the Institute reserves the right to have such articles revised or rearranged, where necessary, in order to bring them up to the required standard of articles published in the PROCEEDINGS—the cost, if any, to be deducted from the compensation due the author.

Reprints of Articles Twenty copies of reprints are furnished authors free of charge. Additional copies to the number desired will be furnished at author's expense, provided request is made before going to press.

Discussions Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at approximately one-half the rate for original articles.

Book Reviews As soon as practicable after the publication of books on subjects of professional interest, the Institute aims to publish authoritative reviews of them.

Address of Members To insure the delivery of the PROCEEDINGS and other communications from the U. S. Naval Institute, it is essential that members and subscribers *notify the Secretary and Treasurer of every change of address without delay*. No responsibility can be accepted for failure to receive the PROCEEDINGS, where members fail to comply with this rule.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE, 1924

A prize of two hundred dollars, with a gold medal and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original article on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the article.

On the opposite page are given suggested topics. Articles are not limited to these topics and no additional weight will be given an article in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original articles published in the PROCEEDINGS during 1923 shall be eligible for consideration for the prize.

2. No article received after October 1 will be available for publication in 1923. Articles received subsequent to October 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best article published during 1923 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more articles receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. The method adopted by the Board of Control in selecting the Prize Essay is as follows:

(a) Prior to the January meeting of the Board of Control each member will submit to the Secretary and Treasurer a list of the articles published during the year which, in the opinion of that member, are worthy of consideration for prize. From this a summarized list will be prepared giving titles, names of authors, and number of original lists on which each article appeared.

(b) At the January meeting of the Board of Control this summary will, by discussion, be narrowed down to a second list of not more than ten articles.

(c) Prior to the February meeting of the Board of Control, each member will submit his choice of five articles from the list of ten. These will be summarized as before.

(d) At the February meeting of the Board of Control this final summary will be considered. The Board will then decide by vote which articles shall finally be considered for prize and shall then proceed to determine the relative order of merit.

6. It is requested that all articles be submitted typewritten and in duplicate; articles submitted written in longhand and in single copy will, however, receive equal consideration.

7. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.

SUGGESTED TOPICS FOR ARTICLES

- Aviation—Its Present Status and Probable Influence on Strategy and Tactics.
- The Anti-Aircraft Problem from the Navy's Viewpoint.
- Co-ordination of the Naval Air Force with Other Naval Forces.
- Naval Bases, Their Number, Location, and Equipment.
- Military Character.
- The Relation of Naval Communication to Naval Strategy.
- Proportion of National Budget Which Should be Devoted to Naval Expenditures.
- The Necessity for Having a Fleet.
- Organization of Fleet for War.
- The Offensive and Defensive in Gas Warfare.
- The Best Protection from Gas Attack.
- Naval Gunnery of Today, the Problems of Long Range and Indirect Fire.
- Physical Factors in Efficiency.
- The Relation between the Navy and the Merchant Marine.
- America as a Maritime Nation.
- Relation of the Medical Department to a Plans Division.
- The Place of Mines in Future Naval Warfare.
- A Mobilization Program for the Future.
- Morale Building.
- The Mission of the Naval Academy in the Molding of Character.
- How to Best Educate and Convert the American People to the Need of a Strong National Defense.
- The Navy in Battle; Operations of Air, Surface, and Underwater Craft.
- Navy Spirit—Its Value to the Service and to the Country.
- Based on a Major Ship Strength of Eighteen Dreadnaughts, What Do You Consider a Balanced Navy?
- The Future of the Naval Officers' Profession.
- The Naval Officer as a Diplomat.
- Is the Present System of Training and Education for Officers Satisfactory and Sufficient?
- The Role of the Navy at Peace.
- Training Naval Personnel During the Next Ten Years.
- Six Years of Promotion by Selection in U. S. Navy. Its Effect Upon Discipline and Morale.
- The Employment of Retired Officers Separated from the Service by Reason of the Age in Grade Feature of the Existing Selection Law.
- What Measures Should be Adopted to Create and Maintain a Balanced Enlisted Personnel of 120,000 Men?
- Our Future Naval Policy Based on Existing International Treaties.
- The Future Naval Continental Shore Establishments.
- Shore Duty for Enlisted Men.
- The Limits of Specialization in Naval Training.
- The Effect of the 5-5-3 Ratio Upon U. S. Naval Strategy in the Eastern Pacific.
- Armor or High Speed for Large Surface Vessels?
- Airplanes and Submarines Versus Super-Dreadnaughts.
- The Navy's Relation to the Nation in World Affairs.



